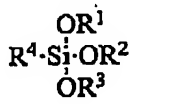
## EXHIBIT B

1. (Previously amended) A method of preparing siliceous materials comprising combining an organic polyol silane precursor with one or more additives under conditions suitable for hydrolysis and condensation of the precursor to a siliceous material, wherein the one or more additives are selected from one or more water-soluble polymers and one or more trifunctional silanes of Formula I:



I

wherein $OR^1$, $OR^2$ and $OR^3$ are the same or different and represent a group that is hydrolyzed under normal sol-gel conditions to provide Si-OH groups; and $R^4$ is group that is not hydrolyzed under normal sol-gel conditions, wherein the conditions suitable for hydrolysis and condensation of the precursor to a siliceous material comprise combining the organic polyol silane precursor with the one or more additives at a pH in the range of about 4 to about 11.5.

2. (Original) The method according to claim 1, wherein the one or more additives are water soluble polymers selected from one or more of polyethers, polyalcohols, polysaccharides, poly(vinyl pyridine), polyacids, polyacrylamides and polyallylamine.

3. (Original) The method according to claim 2, wherein the one or more additives are water soluble polymers selected from one or more of polyethylene oxide (PEO), polyethylene glycol (PEG), amino-terminated polyethylene oxide (PEO-$NH_2$), amino-terminated polyethylene glycol (PEG-$NH_2$), polypropylene glycol (PPG), polypropylene oxide (PPO), polypropylene glycol bis(2-amino-propyl ether) (PPG-$NH_2$), polyvinyl alcohol, poly(acrylic acid), poly(vinyl pyridine), poly(N-isopropylacrylamide) (polyNIPAM) and polyallylamine (PAM).

4. (Original) The method according to claim 3, wherein the one or more additives are water soluble polymers selected from one or more of PEO, PEO-$NH_2$, PEG, PPG-$NH_2$, polyNIPAM and PAM.

5. (Original) The method according to claim 3, wherein the one or more additives are water soluble polymers selected from one or more of PEO, PEO-$NH_2$ and polyNIPAM.

6. (Original) The method according to claim 1, wherein the one or more additives is a mixture of water soluble polymers,

7. (Original) The method according to claim 6 wherein the mixture of water soluble polymers comprises PEO and PEO-$NH_2$.

8. (Original) The method according to claim 5, wherein the one or more additives is PEO.

9. (Original) The method according to claim 8, wherein the PEO has a molecular weight that is greater than about 10,000 g/mol.

10. (Original) The method according to claim 9, wherein the PEO is used at a concentration of greater than about 0.005 g/mL of final solution.

11. (Original) The method according to claim 5, wherein the one or more additives is PEO-$NH_2$.

12. (Original) The method according to claim 11, wherein the PEO-$NH_2$ has a molecular weight that is greater than about 3,000 g/mol and is used at a concentration of about 0.005 g/mL of final solution.

13. (Original) The method according to claim 5, wherein the one or more additives is poly(N-isopropylacrylamide).

14. (Original) The method according to claim 13, wherein the poly(N-isopropylacrylamide) has a molecular weight that is about 10,000 g/mol and is used at a concentration of about 0.005 g/mL of final solution.

15. (Original) The method according to claim 1, wherein the one or more additives is a compound of Formula I.

16. (Original) The method according to claim 15, wherein $OR^1$, $OR^2$ and $OR^3$ are the same or different and are derived from organic di- or polyols.

17. (Original) The method according to claim 16, wherein $OR^1$, $OR^2$ and $OR^3$ are the same or different and are derived from sugar alcohols, sugar acids, saccharides, oligosaccharides or polysaccharides.

18. (Previously amended) The method according to claim 16, wherein $OR^1$, $OR^2$ and $OR^3$ are the same or different and are derived from allose, altrose, glucose, mannose, gulose, idose, galactose, talose, ribose, arabinose, xylose, lyxose, threose, erythrose, glyceraldehydes, sorbose, fructose, dextrose, levulose, sorbitol, sucrose, maltose, cellobiose, lactose, dextran (500-50,000 MW), amylose, pectin, glycerol, propylene glycol or trimethylene glycol.

19. (Original) The method according to claim 18, wherein $OR^1$, $OR^2$ and $OR^3$ are the same or different and are derived from glycerol, sorbitol, maltose, trehalose, glucose, sucrose, amylose, pectin, lactose, fructose, dextrose and dextran.

20. (Original) The method according to claim 18, wherein $OR^1$, $OR^2$ and $OR^3$ are the same or different and are derived from glycerol, sorbitol, maltose or dextran.

21. (Original) The method according to claim 15, wherein $OR^1$, $OR^2$ and $OR^3$ are the same or different and are selected from $C_{1-4}$alkoxy, aryloxy and arylalkyleneoxy.

22. (Original) The method according to claim 21, wherein wherein $OR^1$, $OR^2$ and $OR^3$ are the same or different and are selected from $C_{1-4}$alkoxy, phenyoxy, naphthyloxy and benzyloxy.

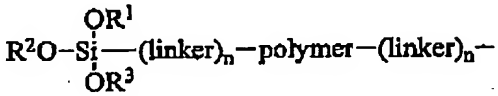
23. (Original) The method according to claim 22, wherein wherein $OR^1$, $OR^2$ and $OR^3$ are the same or different and are selected from $C_{1-4}$alkoxy.

24. (Original) The method according to claim 23, wherein $OR^1$, $OR^2$ and $OR^3$ are all ethoxy.

25. (Original) The method according to claim 15, wherein $R^4$ is selected from the group consisting of:

polyol-(linker)-;

polymer-(linker)$_n$-; and



wherein n is 0-1.

26. (Original) The method according to claim 25, wherein the polyol is an organic di- or polyol.

27. (Original) The method according to claim 26, wherein the polyol is selected from the group consisting of a sugar alcohol, sugar acid, saccharide, oligosaccharide and polysaccharide.

28. (Original) The method according to claim 27, wherein the polyol is a selected from the group consisting of allose, altrose, glucose, mannose, gulose, idose, galactose, talose, ribose, arabinose, xylose, lyxose, threose, erythrose, glyceraldehydes, sorbose, fructose, dextrose, levulose, sorbitol, sucrose, maltose, cellobiose, lactose. dextran, (500-50,000 MW), amylose, pectin, glycerol, propylene glycol and trimethylene glycol.

29. (Original) The method according to claim 28, wherein the polyol is selected from the group consisting of glycerol, sorbitol, maltose, trehalose, glucose, sucrose, amylose, pectin, lactose, fructose, dextrose and dextran.

30. (Previously amended) The method according to claim 29, wherein the polyol is selected from the group consisting of glycerol, sorbitol, glucose, maltose and dextrose.

31. (Original) The method according to claim 25 wherein the polymer is a water soluble polymer.

32. (Original) The method according to claim 31, wherein the polymer is selected from the group consisting of polyethylene oxide (PEO), polyethylene glycol (PEG), amino-terminated polyethylene oxide (PEO-$NH_2$), amino-terminated polyethylene glycol (PEG-$NH_2$), polypropylene glycol (PPG), polypropylene oxide (PPO), polypropylene glycol bis(2-amino-propyl ether) (PPG-$NH_2$), polyvinyl alcohol, poly(acrylic acid), poly(vinyl pyridine), poly(N-isopropylacrylamide) (polyNIPAM) and polyallylamine (PAM).

33. (Original) The method according to claim 32, wherein the water soluble polymer is selected from the group consisting of PEO, PEO-$NH_2$, PEG, PPG-$NH_2$, polyNIPAM and PAM.

34. (Original) The method according to claim 33, wherein the polymer is PEO.

35. (Original) The method according to claim 25, wherein the linker is selected from the group consisting of $C_{1\text{-}20}$alkylene, $C_{1\text{-}20}$alkenylene, organic ethers, thioethers, amines, esters, amides, urethanes, carbonates and ureas.

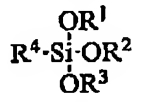
36. (Original) The method according to claim 25, wherein the compound of Formula I is selected from one or more of:
GluconamideSi (Compound **1**);
MaltonamideSi (Compound **2**);
DextronamideSi (Compound **3**);
$(CH_2CH_2O)_p[(EtO)_3Si(C_3H_6)]_2$, p ~4-5, average MW 200 (Compound **5a**);
$(CH_2CH_2O)_p[(EtO)_3Si(C_3H_6)]_2$, p ~13, average MW 600 (Compound **5b**);
$(CH_2CH_2O)_p[(EtO)_3Si(C_3H_6)]_2$, p ~44, average MW 2000 (Compound **5c**); and
$(CH_2CH_2O)_p[(EtO)_3Si(C_3H_6)]_2$, p ~227, average MW 10,000 (Compound **5d**).

37. (Original) The method according to claim 1, wherein the organic polyol silane precursor is selected from the group consisting of diglycerylsilane (DGS), monosorbitylsilane (MSS), monomaltosylsilane (MMS), dimaltosylsilane (DMS) and dextran-based silane (DS).

38. (Currently Amended) The method according to claim 1, wherein the conditions suitable for the hydrolysis and condensation of the precursor to a siliceous material ~~include a pH in the range of about 4-11.5~~ comprise combining the organic polyol silane precursor with the one or more additives in aqueous solutions and with optional sonication to assist in dissolution.

39. (Currently amended) A method of preparing siliceous materials with low shrinkage characteristics comprising:

(a) combining an aqueous solution of one or more compounds of Formula I:



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wherein $OR^1$, $OR^2$ and $OR^3$ are the same or different and represent a group that is hydrolyzed under normal sol-gel conditions to provide Si-OH groups; and $R^4$ is group that is not hydrolyzed under normal sol-gel conditions, with an aqueous solution of an organic polyol silane precursor;

(b) adjusting the pH of the solution in (a) to about 4-11.5;

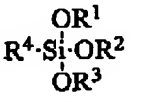
(c) allowing the solution of (b) to gel;

(d) aging the gel of (c); and

(e) drying the aged gel in air.

40. (Original) A siliceous material prepared using the method according to claim 1.

41. (Currently amended) A method of preparing monolithic silica materials comprising combining an organic polyol silane precursor with one or more additives selected from one or more water-soluble polymers and one or more compounds of Formula I:



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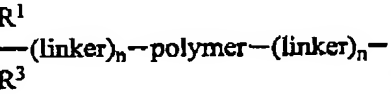
wherein $OR^1$, $OR^2$ and $OR^3$ are the same or different and represent a group that is hydrolyzed under normal sol-gel conditions to provide Si-OH groups, $R^4$ is group selected from polymer-(linker)$_n$- and  and n = 0-1, under conditions where a phase transition occurs before gelation, wherein the conditions where a phase transition occurs before gelation comprise combining the

organic polyol silane precursor with the one or more additives at a pH in the range of about 4 to about 11.5.

42. (Original) The method according to claim 41, wherein $R^4$ is

$$R^2O-Si(OR^1)(OR^3)-(linker)_n-polymer-(linker)_n-$$

43. (Original) The method according to claim 42, wherein the linker group is a $C_{1-4}$alkylene group and n is 1.

44. (Original) The method according to claim 42, wherein $OR^1$, $OR^2$ and $OR^3$ are the same and are selected from $C_{1-4}$alkoxy.

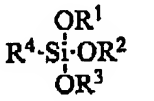
45. (Original) The method according to claim 42, wherein the polymer is PEO.

46. (Original) The method according to claim 41 wherein the compound of Formula I is selected from the group consisting of:
$(CH_2CH_2O)_p[(EtO)_3Si(C_3H_6)]_2$, p ~4-5, average MW 200 (Compound **5a**);
$(CH_2CH_2O)_p[(EtO)_3Si(C_3H_6)]_2$, p ~13, average MW 600 (Compound **5b**);
$(CH_2CH_2O)_p[(EtO)_3Si(C_3H_6)]_2$, p ~44, average MW 2000 (Compound **5c**); and
$(CH_2CH_2O)_p[(EtO)_3Si(C_3H_6)]_2$, p ~227, average MW 10,000 (Compound **5d**).

47. (Original) The method according to claim 41, wherein the water soluble polymer is selected from one or more of PEO, PEO-$NH_2$ and poly(NIPAM).

48. (Original) A meso/macroporous silica monolith prepared using the method according to claim 41.

49. (Currently amended) A method of preparing siliceous materials comprising combining an organic polyol silane precursor, a biomolecule of interest and one or more additives under conditions suitable for the hydrolysis and condensation of the precursor to a siliceous material, wherein the one or more additives are selected from one or more water-soluble polymers and one or more trifunctional silanes of Formula I:



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wherein $OR^1$, $OR^2$ and $OR^3$ are the same or different and represent a group that is hydrolyzed under normal sol-gel conditions to provide a Si-OH group; and $R^4$ is group that is not hydrolyzed under normal sol-gel conditions, wherein the conditions suitable for hydrolysis and condensation of the precursor to a siliceous material comprise combining the organic polyol silane precursor, biomolecule and one or more additives at a pH in the range of about 4 to about 11.5.

50. (Original) A siliceous material comprising a biomolecule entrapped therein prepared using the method according to claim 49.

51. (Previously amended) A method for the quantitative or qualitative detection of a test substance that reacts with, binds to and/or whose reactivity is catalyzed by an active biological substance, wherein said biological substance is encapsulated within a siliceous material, comprising:

(a) preparing the siliceous material comprising said active biological substance entrapped within a porous, silica matrix using a method according to claim 49;

(b) bringing said biological-substance-containing siliceous material into contact with a gas or aqueous solution comprising the test substance; and

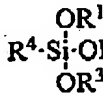
(c) quantitatively or qualitatively detecting, observing or measuring the change in one or more characteristics in the biological substance entrapped within the siliceous

material and/or, alternatively, quantitatively or qualitatively detecting, observing or measuring the change in one or more characteristics in the test substance.

52. (Original) The method according to claim 51, wherein the change in one or more characteristics of the entrapped biological substance is qualitatively or quantitatively measured by spectroscopy, utilizing one or more techniques selected from UV, IR, visible light, fluorescence, luminescence, absorption, emission, excitation and reflection.

53. (Original) A method of storing a biologically active biological substance in a silica matrix, wherein the biological substance is an active protein or active protein fragment, wherein the silica matrix prepared using a method according to claim 49.

54. (Currently amended) A method of preparing a monolithic silica chromatographic column comprising placing a solution comprising an organic polyol silane precursor and one or more additives selected from one or more water-soluble polymers and one or more compounds of Formula I:



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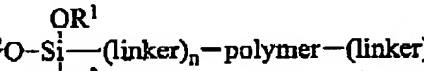
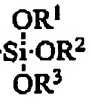
wherein $OR^1$, $OR^2$ and $OR^3$ are the same or different and represent a group that is hydrolyzed under normal sol-gel conditions to provide a Si-OH group; $R^4$ is group selected from polymer-(linker)$_n$- and  and n = 0-1, in a column under conditions suitable for a phase transition to occur before gelation, wherein the conditions suitable for a phase transition to occur before gelation comprise combining the organic polyol silane precursor with the one or more additives at a pH in the range of about 4 to about 11.5.

55. (Previously amended) The method according to claim 54, wherein the solution further comprises one or more substances, which provide cationic sites that counterbalance an anionic charge of the silica to reduce non-selective interactions

56. (Currently amended) A chromatographic column comprising a silica monolith prepared by combining an organic polyol silane precursor and one or more additives selected from one or more water-soluble polymers and one or more compounds of Formula I:



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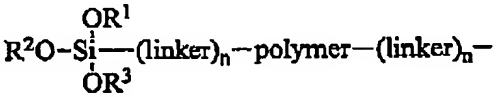
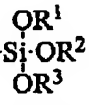
wherein $OR^1$, $OR^2$ and $OR^3$ are the same or different and represent a group that is hydrolyzed under normal sol-gel conditions to provide Si-OH groups; $R^4$ is group selected from polymer-(linker)$_n$- and  and n = 0-1, under conditions where a phase transition occurs before gelation, wherein the conditions suitable for a phase transition to occur before gelation comprise combining the organic polyol silane precursor with the one or more additives at a pH in the range of about 4 to about 11.5.

57. (Currently amended) A method of preparing a monolithic silica column having an active biomolecule entrapped therein comprising combining:

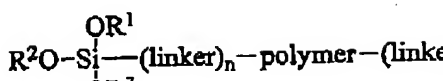
a) a polyol-silane derived silica precursor;

b) one or more additives selected from one or more water soluble polymers and one or more compounds of Formula I:



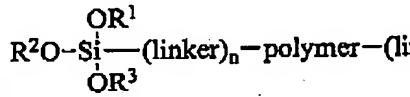
I,

wherein $OR^1$, $OR^2$ and $OR^3$ are the same or different and represent a group that is hydrolyzed under normal sol-gel conditions to provide Si-OH groups, $R^4$ is group

selected from polymer-(linker)$_n$- and  and n is 0-1; and

c) a biomolecule;

under conditions wherein a phase separation occurs before gelation, wherein the conditions suitable for a phase transition to occur before gelation comprise combining the organic polyol silane precursor with the one or more additives at a pH in the range of about 4 to about 11.5..

58. (Original) The method according to claim 57, wherein the one or more additives is one or more water soluble polymers or one or more compounds of Formula I, wherein $R^4$ is 

59. (Previously amended) The method according to claim 57, wherein the organic polyol silane silica precursor, one or more additives and biomolecules are also combined with a substance which provides cationic sites that counterbalance an anionic charge of the silica to reduce non-selective interactions.

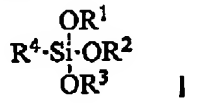
60. (Original) A chromatographic column prepared using a method according to claim 57.

61. (Original) A method of performing immunoaffinity chromatography, sample cleanup, solid phase extraction or preconcentration of analytes, removal of unwanted contaminants, solid phase catalysis or frontal affinity chromatography comprising:

(a) applying a sample to a column according to claim 60: and

(b) performing immunoaffinity chromatography, sample cleanup, solid phase extraction or preconcentration of analytes, removal of unwanted contaminants, solid phase catalysis or frontal affinity chromatography.

62. (Previously amended) A method of preparing siliceous materials with enhanced protein stabilizing ability comprising combining an organic polyol silane precursor with one or more additives under conditions suitable for hydrolysis and condensation of precursor to a siliceous material, wherein the one or more additives is selected from one or more trifunctional silanes of Formula I:



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wherein wherein $OR^1$, $OR^2$ and $OR^3$ are the same or different and represent a group that is hydrolyzed under normal sol-gel conditions to provide a Si-OH group and $R^4$ is polyol-(linker)-.

63. (Previously amended) The method according to claim 62, wherein the polyol in $R^4$ is derived from sugar alcohols, sugar acids, saccharides, oligosaccharides or polysaccharides.

64. (Original) The method according to claim 63, wherein the polyol in $R^4$ is derived from allose, altrose, glucose, mannose, gulose, idose, galactose, talose, ribose, arabinose, xylose, lyxose, threose, erythrose, glyceraldehydes, sorbose, fructose, dextrose, levulose, sorbitol, sucrose, maltose, cellobiose, lactose, dextran (500-50,000 MW), amylose, pectin, glycerol, propylene glycol or trimethylene glycol.

65. (Original) The method according to claim 64, wherein the polyol in $R^4$ is derived from glycerol, sorbitol, maltose, trehalose, glucose, sucrose, amylose, pectin, lactose, fructose, dextrose ort dextran.

66. (Original) The method according to claim 65, wherein the polyol in $R^4$ is derived from glycerol, sorbitol, glucose, maltose or dextran.

67. (Original) The method according to claim 66, wherein the polyol in $R^4$ is derived from glucose or maltose.

68. (Previously amended) The method according to claim 62 wherein the one or more additives is GluconamideSi (Compound 1) and/or MaltonamideSi (Compound 2).

69. (Original) The method according to claim 62, wherein the protein is a kinase, luciferase, or urease or is Factor Xa.

70. (Original) The method according to claim 69, wherein the protein is Src protein tyrosine kinase.

71. (Original) The method according to claim 62, further comprising combining the organic polyol silane precursor and one or more additives with a substrate for the protein to be entrapped.

72. (Original) The method according to claim 71, wherein the protein is a kinase and the substrate is a source of phosphate.

73. (Original) The method according to claim 72, wherein the substrate is ATP.

74. (Previously added) The method according to claim 59, wherein the substance which provides cationic sites that counterbalance an anionic charge of the silica to reduce non-selective interactions is aminopropyltriethoxysilane (APTES), PAM, PPG-$NH_2$ and/or PEG-$NH_2$.

## EXHIBIT C

Evidence is provided below to demonstrate that DGS ≠ TEOS; DGS ≠ TEOS + glycerol; DGS ≠ PGS; DGS ≠ PGS + glycerol. In all cases, a head-to-head experiment was run using PEO of 10K MW. The experimental procedures are shown below.

As can be seen from the attached scanning electron microscopy (SEM) pictures, the DGS samples 1, 5, 6 exhibit macroporosity and (not shown) mesoporosity. The morphology of the structures varies, but is in all cases open. Sample 2 is not macroporous. Under these conditions, the gelation occured prior to phase separation. In order to slow down gelation, one equivalent of glycerol was added while other conditions were kept constant. The retarded hydrolysis rate led phase separation occurring *prior* to gelation and a macroporous structure was achieved (sample 6). To more broadly show the effect of changing the rate, 1 equiv. of glycerol was added to all of DGS, TEOS and PGS systems (samples 5, 6, 7, 8 11 and 12). As can be clearly seen, under these conditions only DGS at either pH 5.5 or pH 11 led to macroporous structures, while TEOS and PGS did not.

The SEM pictures of TEOS derived silica show that macroporous structures are not formed: with glycerol present, a 2 phase system results that does not cure within 1 day.

PGS does not lead to macroporous silica, irrespective of the presence of glycerol.

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Procedure: Sample 1: **DGS** (1.00 g, 4.71 mmol) was dissolved in $H_20$ (1000 µL) at 0 °C with sonication for 20 min. An aqueous solution of HEPES buffer (1000 µL) at 50 mM, pH 5.5 (sample 1) (or pH 11 (sample 2)) containing 16% PEO (MW=10,000) (w/v) was added and mixed. The mixture was allowed to stand at room temperature to gel. Phase separation and gelation occurred after 2 min (sample 1) and 3 min (sample 2), respectively, to give an opaque hydrogel. The gel was aged at 4 °C overnight, followed by aging at room temperature for 2 days. After washing with $H_2O$ (each time 10 mL x 5 times), and drying in air at room temperature for 1 week, an opaque xerogel was obtained. Samples 2 (pH 11), 5 and 6 were prepared similar to sample 1, reaction conditions are listed in Table 1. For 5 and 6, 1 equivalent of glycerol (to DGS) was added to DGS aqueous solution.

Sample 3: **TEOS** (0.98 g, 4.71 mmol) was mixed with $H_2O$ (1000 µL) and sonicated at 0 °C for 20 min. An aqueous solution of HEPES buffer (1000 µL) at 50 mM, pH 5.5 (sample 3, pH 11, sample 4) containing 16% PEO (MW=10,000) (w/v) was added and stirred at room temperature for another 20 min. The mixture was allowed to stand at room temperature for 30 min, two solution layers formed and after 1 day there was a small amount of white solid precipitate which was collected by centrifugation, washed with $H_2O$ and dried in air. Samples 4, 7 and 8 were prepared similar to sample 1, reaction conditions are listed in Table 1. For 7 and 8, 1 equivalent of glycerol (to TEOS) was added. In sample 4, a very small amount of white precipitate formed in the interface of two layers after standing at room temperature for 1 day, which was collected by centrifugation, washed with $H_2O$ and dried in air.

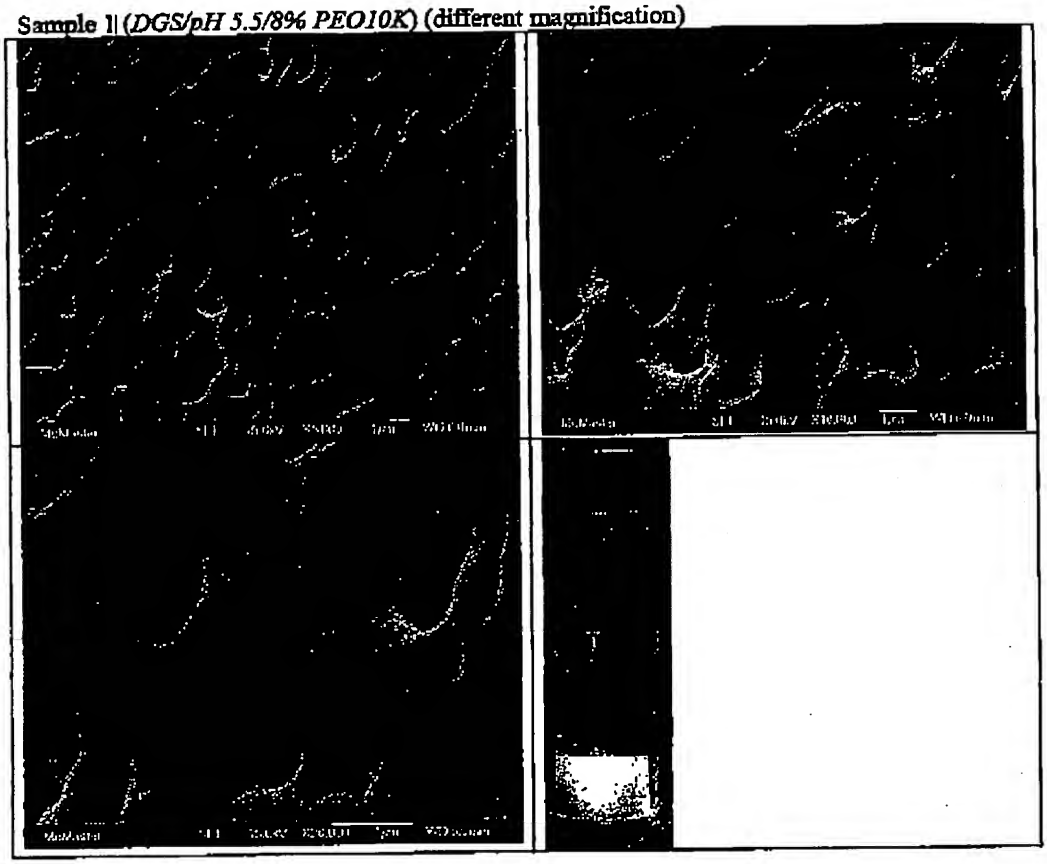
Samples **9** and **10**: **PGS** was prepared according to the literature (Gill, J. Am. Chem. Soc. 1998, 120, 8587-8598). It was found that PGS is not fully soluble in $H_2O$. The mixture of PGS (5.00 g) and $H_2O$ (5000 µL) was sonicated at 0 °C for 20 min, and filtered; an insoluble solid (1.17 g) remained. In order to keep the ratio of Si:$H_2O$:PEO consistent with the DGS and TEOS system, to the filtrate was added $H_2O$ (1420 µL). Thus, this prehydrolyzed PGS solution contained 0.6 g (4.71) mmol of PGS in 1000 µL $H_2O$. Sample **9** and **10** then were prepared similar to sample **1** and **2**, reaction conditions are listed in Table 1. For **11** and **12**, 1 equivalent of glycerol (to PGS) was added to the PGS aqueous solution.

**Table 1. Reaction condition for preparation of silica monolith.**

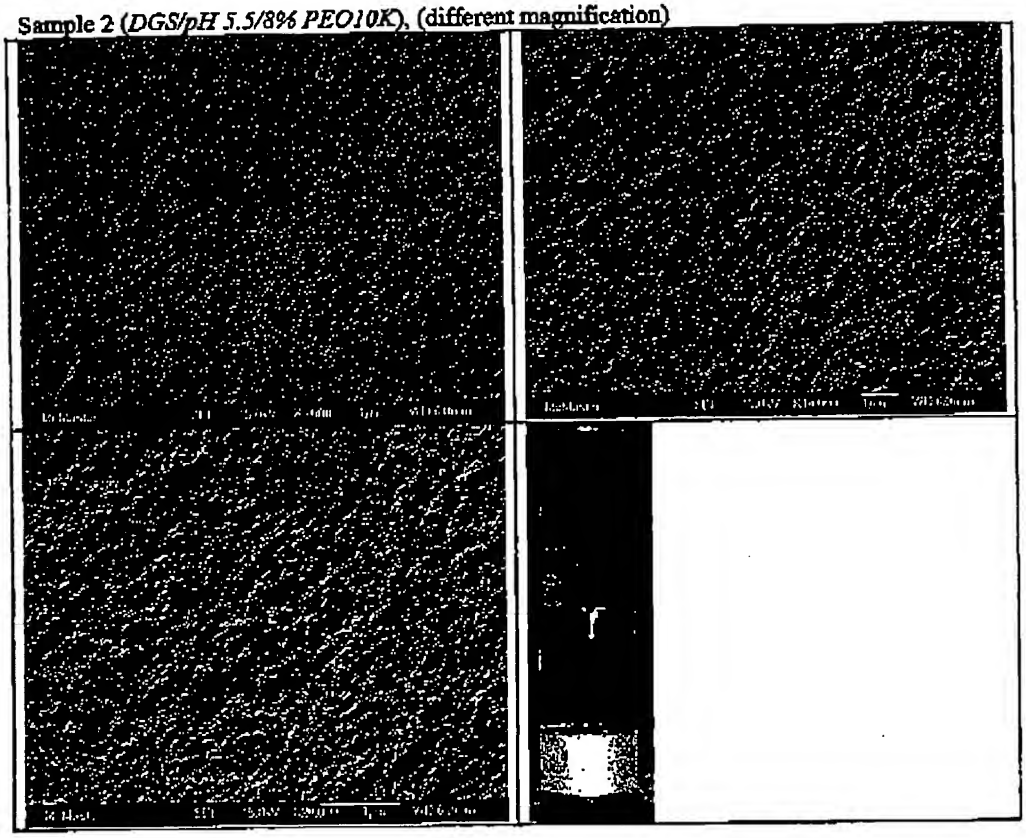
| Sample | DGS, g (mmol) | TEOS, g (mmol) | PGS G(mmol) | Additional glycerol g(mmol) | HEPES buffer (original 50mM), containing 16% w/v, PEO-10K | |
|---|---|---|---|---|---|---|
| | | | | | pH 5.5 | pH 11 |
| 1 | 1.00 (4.71) | | | | 1 mL | |
| 2 | 1.00 (4.71) | | | | | 1 mL |
| 3 | | 0.98 (4.71) | | | 1 mL | |
| 4 | | 0.98 (4.71) | | | | 1 mL |
| 5 | 1.00 (4.71) | | | 0.433(4.71) | 1 mL | |
| 6 | 1.00 (4.71) | | | 0.433(4.71) | | 1 mL |
| 7 | | 0.98 (4.71) | | 0.433(4.71) | 1 mL | |
| 8 | | 0.98 (4.71) | | 0.433(4.71) | | 1 mL |
| 9 | | | 0.60 (4.71) | | 1 mL | |
| 10 | | | 0.60 (4.71) | | | 1 mL |
| 11 | | | 0.60 (4.71) | 0.433(4.71) | 1 mL | |
| 12 | | | 0.60 (4.71) | 0.433(4.71) | | 1 mL |

SEM images

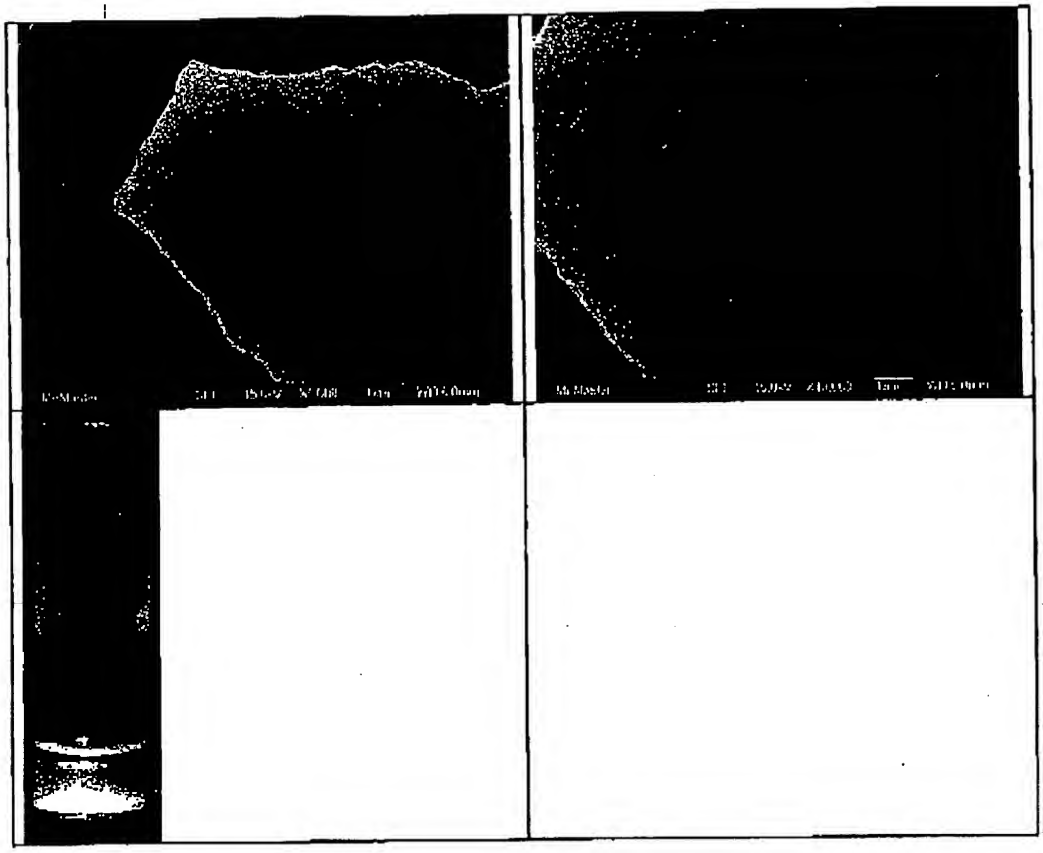
Sample 1| (*DGS/pH 5.5/8% PEO10K*) (different magnification)



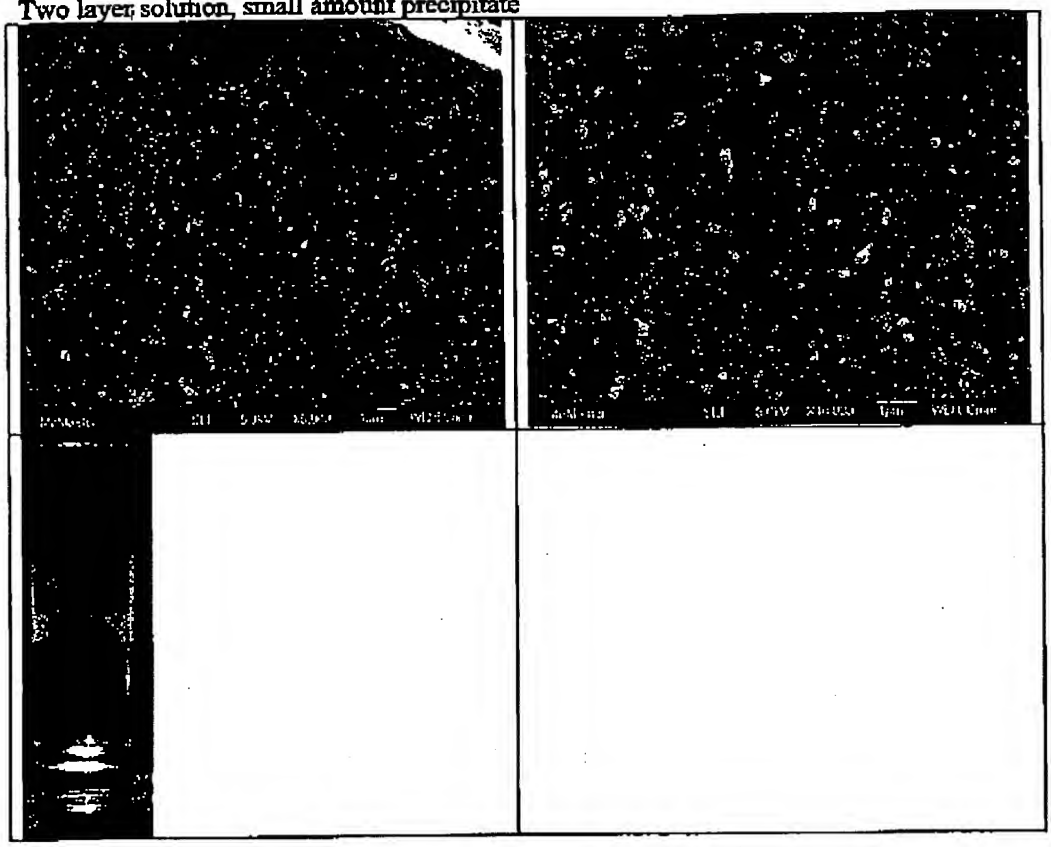
Sample 2 (*DGS/pH 5.5/8% PEO10K*), (different magnification)



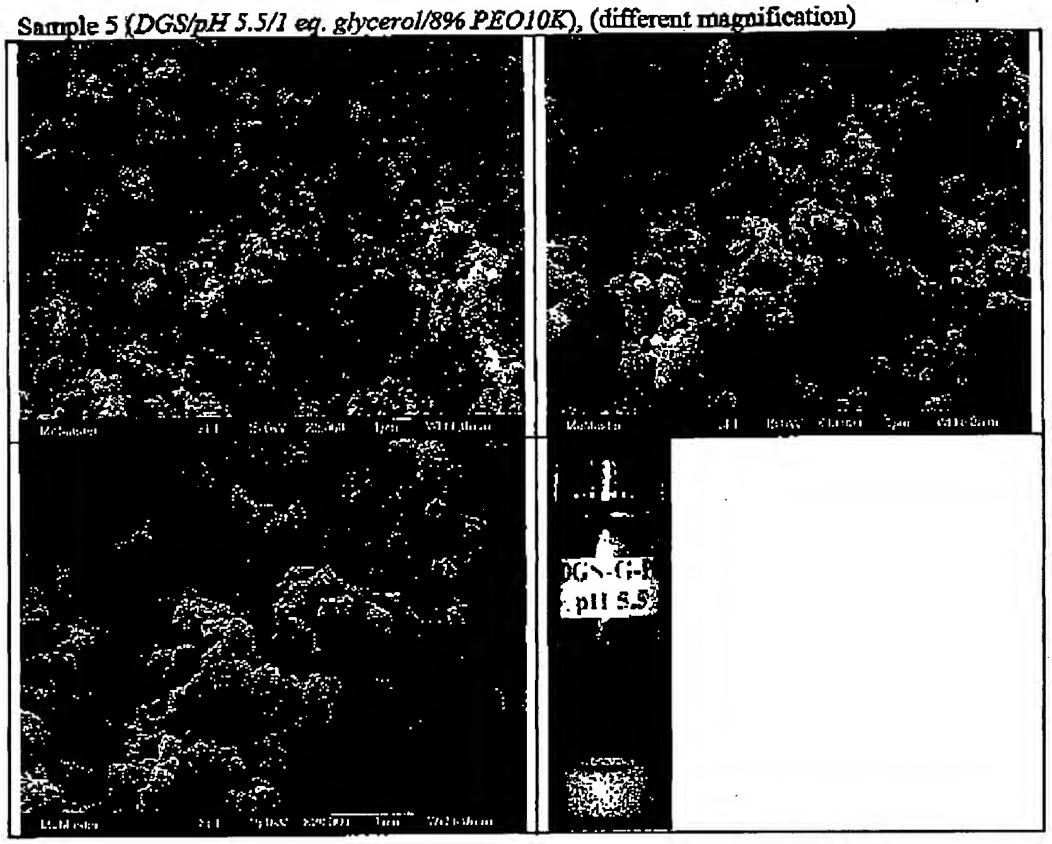
Sample 3 (*TEOS/pH 5.5/8% PEO10K*), (different magnification)
Two layer solution, small amount precipitate



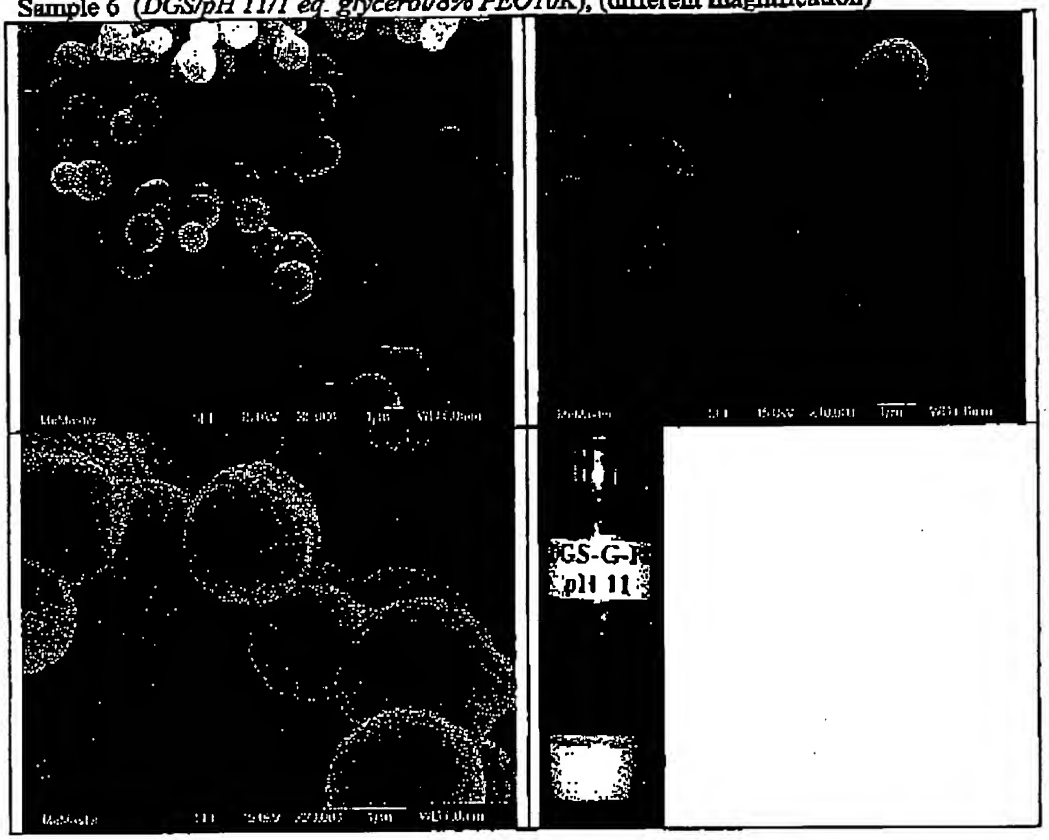
Sample 4 (*TEOS/pH 11/8% PEO10K*), (different magnification)
Two layer solution, small amount precipitate



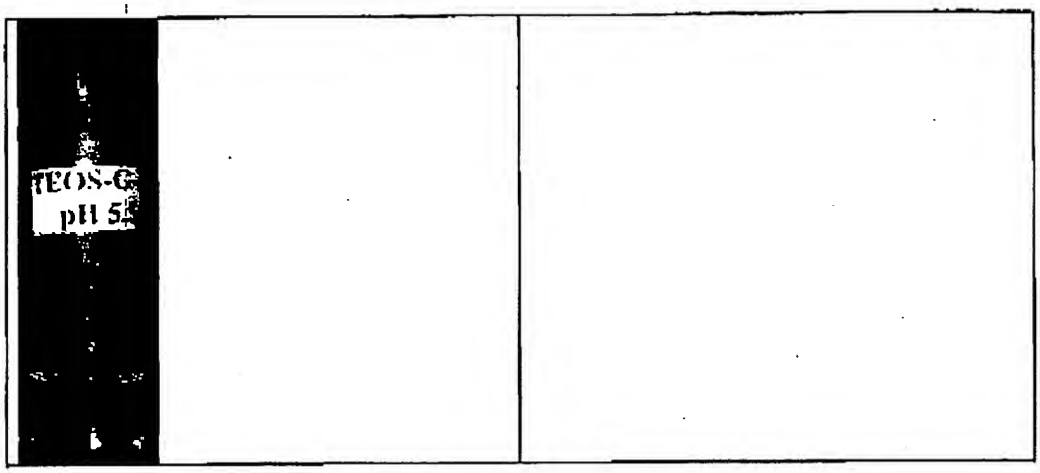
Sample 5 (*DGS/pH 5.5/1 eq. glycerol/8% PEO10K*), (different magnification)



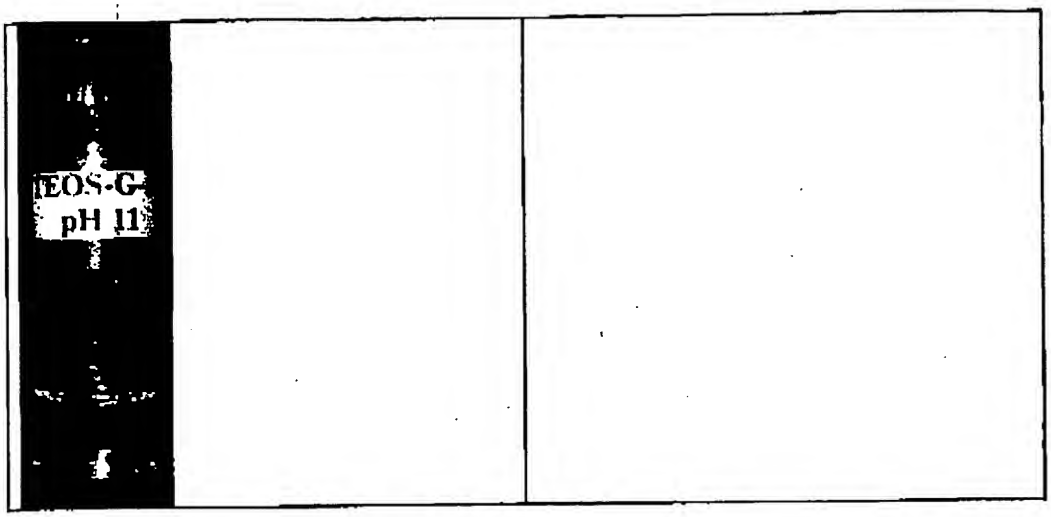
Sample 6 (*DGS/pH 11/1 eq. glycerol/8% PEO10K*), (different magnification)



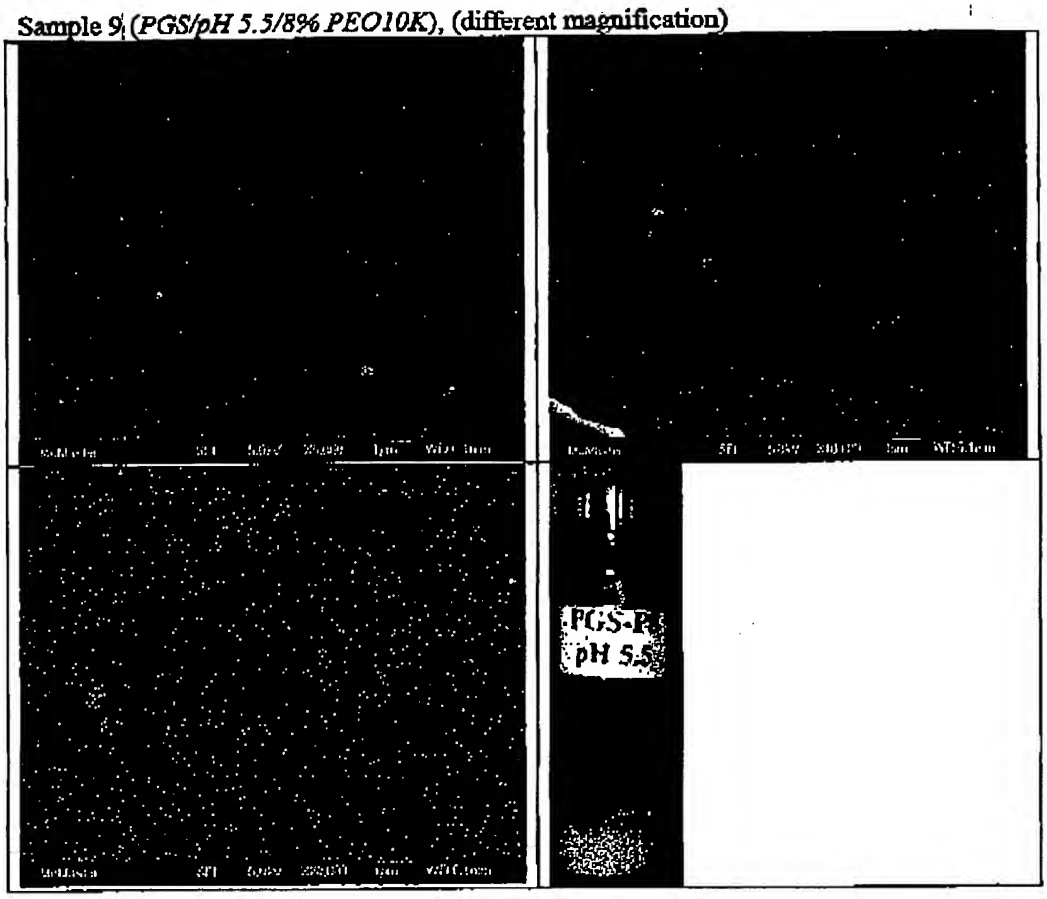
Sample 7 (*TEOS/pH 5.5/1 eq. glycerol/8% PEO10K*), Two layer solution, SEM is not available



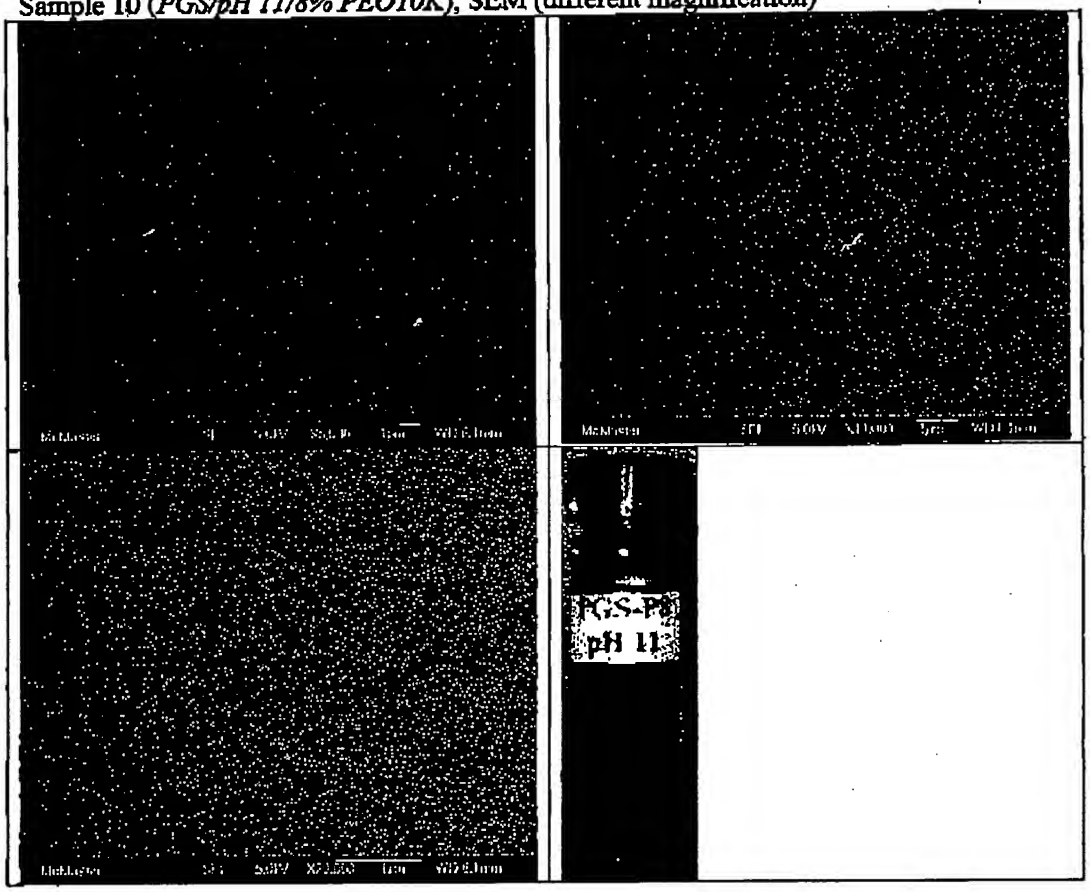
Sample 8 (*TEOS/pH 11/1 eq. glycerol/8% PEO10K*)
Two layer solution, SEM not available



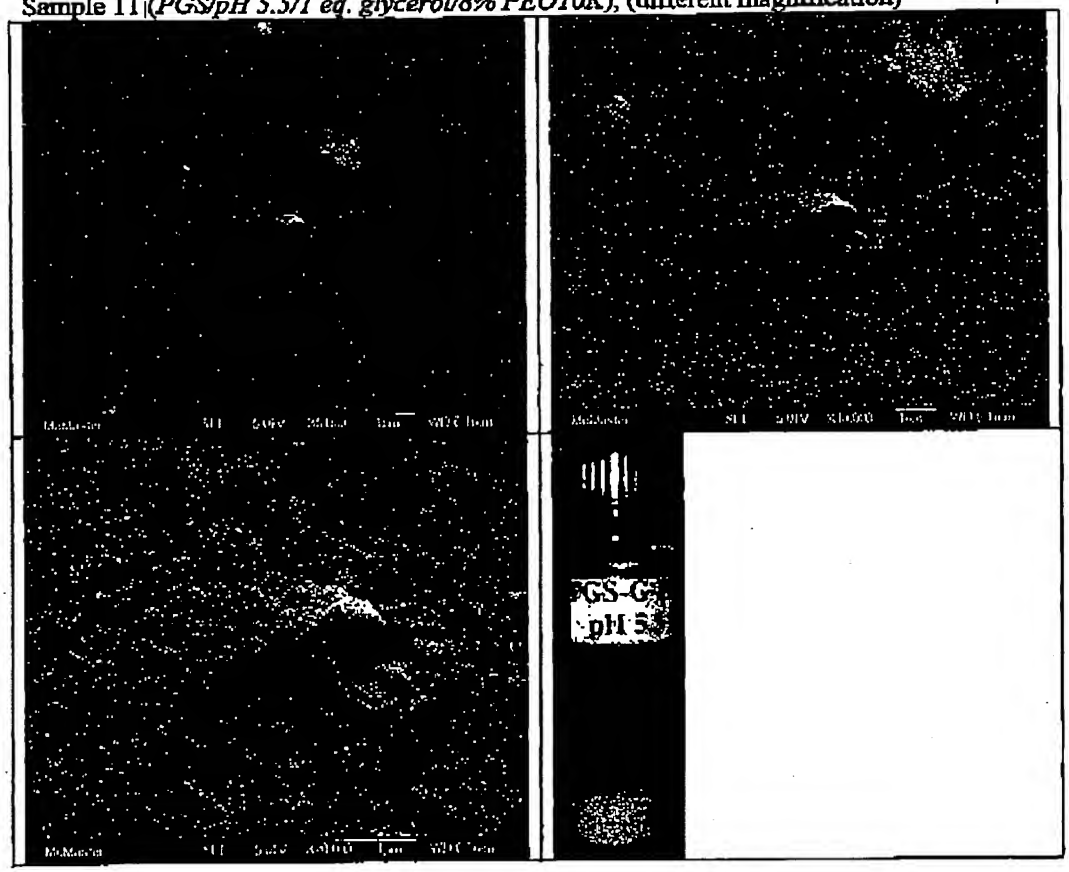
Sample 9, (*PGS/pH 5.5/8% PEO10K*), (different magnification)



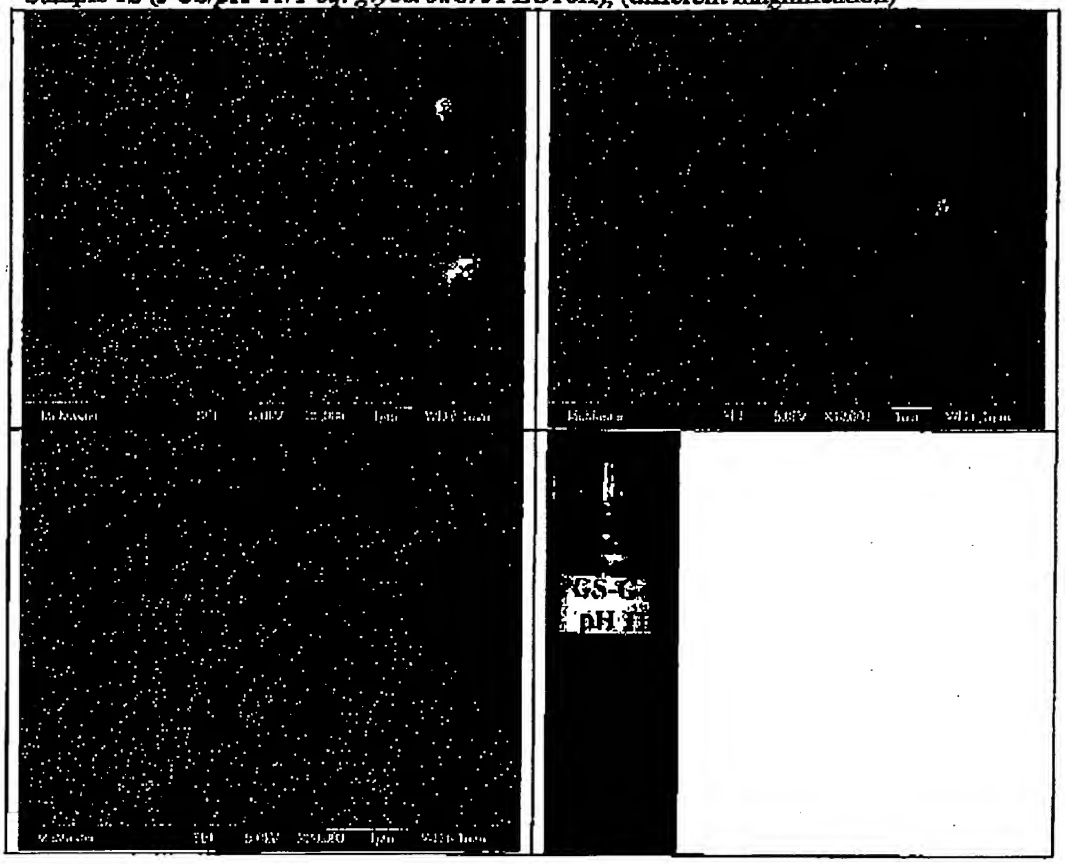
Sample 10 (*PGS/pH 11/8% PEO10K*), SEM (different magnification)



Sample 11 (*PGS/pH 5.5/1 eq. glycerol/8% PEO10K*), (different magnification)



Sample 12 (*PGS/pH 11/1 eq. glycerol/8% PEO10K*), (different magnification)



35. F. D. Bayles and M. A. Brook, *α and β-Silyl Carbenium Ions*, 28th Organosilicon Symposium, Gainsville, Florida, April 1995, Abstract P-7.
34. R. Ruffolo, M. A. Brook and M. J. McGlinchey, *Towards the stabilization of silenes on bimetallic clusters*, 28th Organosilicon Symposium, Gainsville, Florida, April 1995, Abstract P-9.
33. D. A. Valentini, M. A. Brook, V. Bartzoka and Mark R. McDermott, *Approaches to Grafting Silicones to Cellulose and Starch, 28th Organosilicon Symposium*, Gainsville, Florida, April 1995, Abstract P-10.
32. C. Le Roux, H. Yang, S. Wenzel and M. A. Brook, *Using "Anhydrous" Hydrolysis to Favor Formation of Hexamethylcyclotrisiloxane from Dimethyldichlorosilane*, 28th Organosilicon Symposium, Gainsville, Florida, April 1995, Abstract B-18.
31. V. Bartzoka, M. A. Brook, D. Valentini and Mark R. McDermott *Surface Interactions Between Proteins and Silicon Polymers: Physical and Covalent Adhesion*, 28th Organosilicon Symposium, Gainsville, Florida, April 1995, Abstract P-6.
30. M.A. Brook and T. Stefanac, *Silane Radical Polymerization Initiators; Functionalized Homopolymers and Block Copolymers*, IIIrd International Symposium on Radical Copolymers, Lyon, France, April 1994, Abstract P-52.
29. H. Ketelson, R.H. Pelton and M.A. Brook, *Polyolefin and Silicone Sterically Stabilized Colloids*, IIIrd International Symposium on Radical Copolymers, Lyon, France, April 1994, Abstract, Abstract 148.
28. M.A. Brook and T. Stefanac, *Silane Radical Polymerization Initiators; Functionalized Homopolymers and Block Copolymers*, XXVII Organosilicon Symposium, Troy, New York, March 1994, Abstract B-29.
27. M.A. Brook, G. McGibbon and C. Roos, *Towards Silanones, XXVII Organosilicon Symposium*, Troy, New York, March 1994, Abstract P-54.
26. R. Ruffolo, L. Girard, H. Gupta, A. Decken, M.A. Brook and M.J. McGlinchey, *Towards Metal Stabilized Silicon Cations*, XXVII Organosilicon Symposium, Troy, New York, March 1994, Abstract P-57.
25. M.A. Brook and M. Roth, *The substitution of Electrophiles in Polymeric Systems: Surprisingly Unreactive Vinylsilanes*, XXVII Organosilicon Symposium, Troy, New York, March 1994, Abstract P-55.
24. H. Ketelson, M.A. Brook and R.H. Pelton, *Post-Grafting Silicone Polymers to Vinyl Modified Colloidal Silica Spheres: Switching from an Electrostatically Stabilized Dispersion to a Sterically Stabilized Dispersion*, XXVII Organosilicon Symposium, Troy, New York, March 1994, Abstract P-30.
23. J.M. Dickson, M.A. Brook, C.K. Yeom, J. Jiang, H.K. Gupta, K. Rilling and B.J. Trushinski, *Development of crosslinked oligosilystyrene pervaporation membranes for the removal of chlorohydrocarbons from water*, International Congress on Membranes and Membrane Processes, (ICOM-93), Heidelberg, Germany, Sept. 1993, Abstract 5.11.
22. Jianxiong Jiang and Michael A. Brook, *The Redistribution Reactions Between Cyclic Silicones and Trichlorosilanes*, Canadian Society for Chemistry Conference, Sherbrooke, June 1993, Abstract 540 IN E3.

21. Courtney Henry and Michael A. Brook, *Electrophilic Addition Reactions Involving Organosilane π-Nucleophiles*, Canadian Society for Chemistry Conference, Sherbrooke, June 1993, Abstract 139 IN BSP.
20. M. A. Brook, *The β-effect: Modifying the Ligands on Silicon for Synthetic Control*, OMCOS 6, Utrecht, The Netherlands, August 1991, Abstract A-70.
19. G. A. McGibbbon, M. A. Brook and J. K. Terlouw, *Investigation of β-Silicon Vinyl Carbenium Ions in the Gas Phase*, Canadian Chemical Conference, Hamilton, June 1991, Abstract 857P.
18. C. Dallaire and M. A. Brook, *The Relative Magnitude of the β-effect of Silyl, Germyl and Stannyl Groups in the Stabilization of Vinyl Cations*, Canadian Chemical Conference, Hamilton, June 1991, Abstract 702P.
17. C. Henry, R. Jueschke and M. A. Brook, *Stereocontrolled Addition Reactions fo Carbon Electrophiles to Styrylsilanes*, Canadian Chemical Conference, Hamilton, June 1991, Abstract 700P.
16. P. Modi, M. A. Brook and J.D. Dickson, *Silicon Functionalized Styrene Polymers: Cationic Control with the β-effect*, Canadian Chemical Conference, Hamilton, June 1991, Abstract 461P.
15. M. A. Brook, D.K. Chau and W. Yu, *Electrophilic Cleavage Reactions of Alkoxyhydrosilanes: The Special Case of Tartaric Acid*, XXIV Organosilicon Symposium, El Paso, April 1991, Abstract 99.
14. R. H. Pelton, A. Osterroth and M. A. Brook, *Steric Stabilization of Colloidal Particles*, 73rd Canadian Chemical Conference, Halifax, July 1990, Abstract 741.
13. C. Dallaire and M. A. Brook, *Study of the Stabilization of Vinyl Cations (β-effect) by Group 14 Metals*, IX International Symposium on Organosilicon Chemistry, Edinburgh, Scotland, July 1990, Abstract 4.8.
12. M. A. Brook, R. Jueschke, W. Yu and A. Neuy, *Electrophilic Addition Reactions of β-Silylstyrenes: The Pursuit of a Stable β-Silyl Carbocation*, IX International Symposium on Organosilicon Chemistry, Edinburgh, Scotland, July 1990, Abstract 4.7.
11. Michael A. Brook and S. Müller, *The β-effect in Silyl Enol Ether Reactions: Trapping the Intermediate Siloxy Carbonium Ion*, XXIII Organosilicon Symposium, Midland, Michigan, April 1990, Abstract B4.
10. Michael A. Brook, *The β-effect: Changing the Ligands on Silicon*, 17th Annual Ontario-Quebec Physical Organic Minisymposium, Quebec, Nov. 1989.
9. Michael A. Brook, Peter Hülser and Thomas Sebastian, *Oligotrichlorosilylstyrenes: Highly Functionalized Silicone Precursors*, 25th Canadian High Polymer Symposium, Mississauga, Canada, Aug. 23-25, 1989.
8. Michael A. Brook, Mahmud A. Hadi and Axel Neuy, *An Examination of the β-Effect in an Addition Reaction with Different Ligands on Silicon*, XXII Organosilicon Symposium, Philidelphia, USA, April 1989, Abstract P-15.
7. Michael A. Brook, Elizabeth Jefferson and Thomas Sebastian, *Polytrihalosilylstyrenes: Exploiting the β-Effect for Polymer Synthesis*, 3rd North American Chemical Congress, June 1988, Toronto, Canada, Abstract ORGN-50.

6. Michael A. Brook and Christina H. Kremers, *Glycol-Silicones: Polymeric Organic Reagents?*, XXI Organosilicon Symposium, June 1988, Montreal, Canada, Abstract P-20.
5. Michael A. Brook, *Trihalosilylstyrenes: What happened to the α- and β-Effects*, 15th Annual Physical-Organic Minisymposium, Nov. 1987, Mississauga, Canada.
4. Michael A. Brook and Peter Hülser, *Silyl Triflates: Activators for Carbon-Carbon Bond Formation*, Chemical Institute of Canada Conference, Quebec, June 1987, Abstract ORG-42-D2.
3. Nick Henry Werstiuk, Michael A. Brook and Peter Hülser, *Thermolysis of Silyl Esters: An Ultraviolet Photoelectron Study*, 14th Annual Ontario-Quebec Physical Organic Minisymposium, Nov. 1986, Toronto.
2. Michael A. Brook and Dieter Seebach, *Stabilized Cyclic Nitronates: Intermediates for More Complex Heterocycles*, 10th International Congress of Heterocyclic Chemistry, August 1985, Waterloo, Canada, Abstract G-5-54.
1. T.H. Chan and Michael A. Brook, *Some Uses of Trimethylchlorosilane in Organic Synthesis, Chemical Institute of Canada Conference*, July 1982, Toronto, Abstract OR-18-7.

**Invited Lectures: at Companies**

39 Wacker Chemie, Burghausen Germany — Jan. 2006
***Using Synthesis to Structure Interfaces: Making Silica and Silicones Biocompatible***

38 Xerox (XRCC) — Feb. 2005
*Learning from Nature: Morphological Control of Silica under Mild Conditions*

37 Vistikon, Jacksonville Florida — Dec. 2004
*Controlling biology at silicone interfaces: an integrated approach to ocular materials*

36 AMO, Newport Beach, CA — March 2004
*Controlling biology at silicone interfaces: an integrated approach to ocular materials*

35 Specialty Minerals, Allentown, PA — March 2004
*Protein-doped, controlled morphology silica monoliths and chelating silicones: Learning from nature*

34 Air Products, Allentown, PA — March 2004
*Protein-doped, controlled morphology silica monoliths: Learning from nature*

33 QLT, Vancouver — March 2004
*An Integrated Approach to New Ocular Materials*

32 Novartis Cibavision, Atlanta Georgia — June 2003
*Stabilizing Proteins in Silica and Silicones*

31 Alcon, Fort Worth — June 2003
*Stabilizing Proteins in Silica and Silicones*

30 Dow Corning, Midland Michigan — Apr. 2002
*Controlling Enzyme Stability in Water-in-Silicone Oil Emulsions*

29 Genencor, Palo Alto — Aug. 2001
*Silicone/protein interactions: Modifying hydrophobic/hydrophilic interactions to control both protein and interfacial stability*

28 Sasol, Austin Texas — Aug. 2001

*An Introduction to Silanes and Silicones*
27 General Electric Corporate Research and Development, Waterford NY May 2001
*Silicones at Biopolymers Interfaces: A Look at Beneficial and Not-So-Beneficial Fouling*
26 NPS Pharmaceuticals Mar. 2001
*Silicone:Protein Conjugates: Emulsions that Stabilize Proteins Against Denaturation*
25 Alcon, Fort Worth, Texas Feb. 2001
*Protein-Silicone Mixtures for Biological Cleaning Applications*
24 Glaxo Canada Feb. 2001
*Silicone:protein conjugates: emulsions that stabilize proteins against denaturation.*
23 GE-Bayer, Leverkusen June 2000
*Silicon at the Interface: New Surface Active Silanes and Silicones*
22 Goldschmidt, Essen June 2000
*Silicon at the Interface: New Surface Active Silanes and Silicones*
21 Specialty Minerals, Allentown PA April 2000
*Chelating Silicones*
20 CK Witco Corp. (Sistersville WV) Dec. 1999
*Looking for New Hydrophilic Substrates to Bind to Silicones*
19 Michigan Molecular Institute, Midland MI Oct. 1999
*Silicones at the Interface: What Do Biopolymers Offer*
18 General Electric, Waterford Oct. 1999
*Silicones at the Interface: The Benefits of Combining Silicones with Biopolymers*
17 Unilever, Port Sunlight, UK Sept. 1998
*Working with Silicones*
16 National Starch, New Jersey June 1998
*Confusing Nature: A Look at the Hydrophobization of Biopolymers Using Silanes and Silicones*
15 Brantford Chemical Inc. Dec. 1997
*Using Silicon Chemistry in Drug Delivery: Prodrugs Based on Modified Silica and Oral Protein Delivery Using Silicones*
14 Unilever, UK, Dec. 1997
*Surface Active Materials Based on Silanes, Silicones and Natural Polymers.*
13 Dow Corning Corp. Sept. 1997
*Silicone-Organic Copolymers the Natural Way: An Exploration of Silicone- and Silane-Modified Biopolymers*
12 MacMillan Bloedel, Vancouver BC Sept. 1997
*(Reversible) Modification of Biopolymers Using Silane, Silicone and Organic Coupling Agents.*
11 Eastman Chemical, Kingsport, Tennessee Aug. 1997
*Wood-Plastic Composites: A Role for Organosilane and Silicone Chemistry*
10 Rhône Poulenc, Lyon, France Feb. 1997
*Two Very Different Areas of Silicone Chemistry: Hydrosilsesquioxane-platinum catalysts and Silicone-biopolymer copolymers*
9 General Electric, Schenectedy, NY Dec. 1996

*Hard and soft siloxanes: hydrosilsequioxane: platinum catalysts and silicone: protein copolymers* Sept. 1996

8 3M London, Ontario
*Sticking to Biopolymers: Using the Concept of Functional Group Protection in Polymer Adhesion* May 1996

Rhône Poulenc, Paris, France (2 lectures)
7 *Sterically Stabilized Silica Colloids*
6 *Silicone-Protein Copolymers*
5 Organon, Akzo, Oss, The Netherlands April 1993
*Silicon as Mediator: Making the Drugs and Delivering Them to the Patient*
4 Shell Research Amsterdam (KSLA) July 1990
3 Dow Corning Corporation (Midland, USA) April 1990
2 University of Toronto April 1988
1 Xerox Research Centre of Canada Sept. 1988

**Invited Lectures: at Universities**

81 Michael A. Brook, McMaster University Undergraduate Chemistry Society March 2006.
*Fighting the Imposter Syndrome as a Chemist,*

80 Universite de Montpellier, II, France Jan. 2006
*La silicone et la silice dans une monde biologique: le contrôle de l'interface*

79 Brock University, Chemistry Department Oct. 2004
*Controlling protein stability in silicones and silica: Synthesis of new biomaterials*

78 University of Waterloo, Chemistry Department Oct. 2004
*Controlling protein stability in silicones and silica: Synthesis of new biomaterials*

77 McMaster University, BIMR Summer Research Program Weekly Seminar Series, June 2004
*Compatibilizing proteins with silica and silicones (what do graduate students actually do?)*

76 Institute of Chemistry, Chinese Academy of Sciences, Beijing Nov. 2003
*Using Silicone:Protein Interactions to Stabilize Water/Oil Interfaces and Protein Structure*

75 Qingdao University of Technology Nov. 2003
*Stereocontrol Using Silyl Groups: Enantioselective Reductions and Claisen Rearrangements*

74 Huazhong University of Science and Technology Nov. 2003
*Using Silicone:Protein Interactions to Stabilize Water/Oil Interfaces and Protein Structure*

73 Wuhan University of Technology Nov. 2003
*Protein-Doped Mesoporous Silica for Drug Screening Applications*

72 Nanjing University Nov. 2003
*Using Silicone:Protein Interactions to Stabilize Water/Oil Interfaces and Protein Structure*

71 UWEB (University of Washington Engineered Biomaterials), Seattle, May 2003
*Stabilizing Proteins in Silica and Silicones*

70 Ian Wark Research Institute, University of South Australia, Adelaide, South Australia

Michael A. Brook, Frank LaRonde, Mustafa Mohamed and Forrest Li March 2003
*Stereocontrol Using Silyl Groups: Enantioselective Reductions and Claisen Rearrangements*

69 Ian Wark Research Institute, University of South Australia, Adelaide, South Australia
M. A. Brook, Dan Chen, Kui Guo, Zhang Zheng, John Brennan, and Paul Zelisko March 2003
*Formation of Protein-Containing Controlled Pore Silica for Drug Discovery*

68 Perspectives on Silicon (6 hours lectures during a 30 hour short course), Ian Wark Research Institute, University of South Australia, Adelaide, South Australia July 2002

67 Queensland University of Technology, Brisbane, Australia June 2002
*Bringing Organic Chemistry to Silicon-based Interfaces*

66 University of Sydney, Australia June 2002
*The Passivation of Silica and Protein/Water Interfaces Using Silane Coupling Agents and Functional Silicones.*

65 Flinders University, Adelaide, Australia June 2002
*Stabilization of Water-in-Silicone Oil Emulsions: Surfactants Formed by the Interaction of Proteins/enzymes and Functionalized Silicones*
*Preparing and Passivating Silica: Matching Surface Chemistry to Application*

64 University of South Australia, Adelaide, Australia June 2002
*The Passivation of Silica and Protein/Water Interfaces Using Silane Coupling Agents and Functional Silicones.*

63 McMaster University: Undergraduate Chemistry Series March 2002
*From Oral Vaccines to Breast Implants: What Happens When Proteins Meet Silicones?*

62 Ecole Nationale Supérieure, Lyon, France Feb. 2002
*Protéines chez soi: Dans les silicones et dans la silice (New homes for proteins in silicones and silica)*

61 University of Dresden, Germany, Institute of Polymer Research Feb. 2002
*The passivation of silica and silicone surfaces using silane coupling agents and proteins.*

60 University of Toronto Feb. 2001
*Silicone/protein interactions: Modifying hydrophobic/hydrophilic interactions to control both protein and interfacial stability*

59 University of Windsor Sept. 2000
*Exploiting Extracoordinate Silicon: Enantioselective Reductions and Aldol Reactions Catalyzed by Chiral Amines (and some Silicone-Protein Stuff)*

58 Institut National des Sciences Appliquées de Lyon July 2000
*Silicium à l'Interface: Silanes et Silicones Fonctionnalisés*

57 Institut Charles Sadron, Université Louis Pasteur June 2000
*Silicium à l'Interface: Silanes et Silicones Fonctionnalisés*

56 Universite de Bordeaux I May 2000
*Combining Silicones and Biopolymers: Controlling the Interface (en français)*

55 Ecole Normale Supérieure de Lyon May 2000
*Silicium à l'Interface: Silanes et Silicones Fonctionnalisés*

54 University of Twente May 2000

*Silicon at the Interface: New Surface Active Silanes and Silicones* May 2000
53 University of Amsterdam
*Exploiting Extracoordinate Silicone: Enantioselective Reductions and Aldol Reactions Catalyzed by Chiral Amines* June 1999
52 Kyoto University
*Chiral Extracoordinate Hydrosilanes Derived from Bidentate Ligands: Enantioselective Reduction of Ketones* June 1999
51 Kyoto Institute of Chemistry
*Gifts From Nature: New Materials From Silicones and Biopolymers* May 1999
50 Chinese University of Hong Kong
*Gifts From Nature: New Materials From Silicones and Biopolymers* May 1999
49 University of Hong Kong
*Chiral Extracoordinate Silanes: Catalytic and Enantioselective Reduction* May 1999
48 Hong Kong University of Science and Technology
*Chiral Extracoordinate Silanes Derived From Histidine: Catalytic and Enantioselective Reduction* March 1999
47 McMaster University President's Stewardship "Over the Ivy Wall"
*Confusing Nature: What does Lemon Pledge have to do with Oral Vaccines?* Feb. 1999
46 Chemical Engineering, McMaster University
*Confusing Nature: A Look at the Hydrophobization of Biopolymers Using Silanes and Silicones* Feb. 1999
45 Brock University
*Stereoselective Reduction of Ketones by Histidine: Alkoxysilane Complexes* Nov. 1998
44 Mount Allison University
*Confusing Nature: A Look at the Hydrophobization of Biopolymers Using Silanes and Silicones* Nov. 1998
43 University of New Brunswick
*Confusing Nature: A Look at the Hydrophobization of Biopolymers Using Silanes and Silicones* Nov. 1998
42 Acadia University
*Confusing Nature: A Look at the Hydrophobization of Biopolymers Using Silanes and Silicones* Nov. 1998
41 Dalhousie University
*Confusing Nature: A Look at the Hydrophobization of Biopolymers Using Silanes and Silicones* Oct. 1998
40 McMaster University Board of Governers
*Combining Silicones and Biopolymers: New Materials* Feb. 1998
39 Telemark University, Porsgrunn, Norway
*Silicone Degradation Mechanisms* Dec. 1997
38 Swedish Institute for Pulp and Paper, Stockholm and Swedish Institute For Surface Science, Stockholm
*Silane and Silicone Coupling Agent Chemistry: Are Biopolymer Surfaces Like Siliceous Surfaces?* Oct. 1997
37 University of Toronto, Faculty of Pharmacy,

*Using Silicon Chemistry in Drug Delivery: Prodrugs Based on Modified Silica and Oral Protein Delivery Using Silicones*
36 University of British Columbia Sept. 1997
*Modifying Biopolymers with Silanes and Silicones*
35 Brockhouse Institute for Materials Science, McMaster University Jan. 1997
*Hard and soft siloxanes: hydrosilsequioxane: platinum catalysts and silicone: protein copolymers*
34 McMaster Undergraduate Chemistry Club Nov. 1996
*Silicon in Biology*
*Organosilanes as Protecting Groups: Different Approaches to the Stabilization of Small Molecules, Polymers, Transition Metals and Surfaces*
Université Paul Sabatier, Toulouse, France (3 lectures) June 1996
33 *Organosilanes in an Inorganic World and Inorganic Silicon in an Organic World*
32 *What Happens When Silicon Meets Biology*
31 *Stabilized Group 14 Cations*
Université de Bordeaux I, France, (3 lectures) May 1996
30 Universidad del Pais Vasco, San Sebastian, Spain June 1996
29 *Organosilanes in an Inorganic World and Inorganic Silicon in an Organic World*
28 *What Happens When Silicon Meets Biology*
27 *Stabilized Group 14 Cations*
26 Landbouw Universiteit Wageningen, Wageningen, Netherlands May 1996
***Silicones at the Interface: Starch/Protein/Silicone Microparticles as Oral Vaccines***
25 Université de Namur, Belgium May 1996
*Stabilizing β-Cations and Protecting Transition Metals with Silicon*
24 Rijks Universiteit Utrecht June 1995
*Controlled Modification of Silica Surfaces: Polyolefin and Silicone Sterically Stabilized Silica Colloids*
23 Queen's University Sept. 1994
*Silicone at the Interface: What happens when it's found in unusual places*
22 McMaster University Oct. 1993
*Silicon Mediated Cope-type Cyclizations OR After one year in the Netherlands, what does Fokkje (fok-ya) really mean?*
21 University of Western Ontario Sept. 1993
*Silicon Mediated Cope-type Cyclizations*
20 University of Montpellier May 1993
*Silicon Bearing Electron Withdrawing Groups: Exploiting the Differences*
19 University of Toulouse May 1993
*Silicon Bearing Electron Withdrawing Groups: Exploiting the Differences*
18 University of Bordeaux May 1993
*Silicon as Mediator: Making the Drugs and Delivering Them to the Patient*
17 Free University of Amsterdam March 1993
*Silicon Bearing Electron Withdrawing Groups: Exploiting the Differences*
16 Open University, Milton Keynes, England March 1993
*A Silicon Transplant: From the β-effect to Polymers (focus on silicon extracoordination)*

15 University of Sussex March 1993
*A Silicon Transplant: From the β-effect to Polymers (focus on silicon hyperconjugation)*
14 University of Utrecht: Feb. 1993
*Silicon Bearing Electron Withdrawing Groups: Exploiting the Differences*
13 University of Groningen Feb. 1993
*Silicon Bearing Electron Withdrawing Groups: Exploiting the Differences*
12 University of Amsterdam Jan. 1993
*A Silicon Transplant: From the β-effect to Polymers (focus on synthesis)*
11 Technische Hochschule Darmstadt Jan. 1993
*A Silicon Transplant: From the β-effect to Polymers (focus on β-effect)*
10 Universität Kaiserslautern Jan. 1993
*A Silicon Transplant: From the β-effect to Polymers (focus on silicon hyperconjugation)*
9 ETH-Zürich (Seebach Group Meeting) Feb. 1993
*A Silicon Transplant: From the β-effect to Polymers*
Centre of Advanced Scientific Investigation (CINVESTAV) Mexico City, (2 lectures) March 1992
8 *Polymeric Materials Derived from the β-Effect*
7 *The β-effect: Modifying the Ligands on Silicon*
6 Guelph University March 1992
*A Silicon Transplant: From the β-effect to Polymers*
5 SUNY Binghampton (New York) March 1991
4 Universiteit van Amsterdam July 1990
3 McMaster University (Peacock Lecture Series) Oct. 1989
2 University of Western Ontario Oct. 1988
1 Université de Montréal Dec. 1988

**Courses Taught**

| **2005-06** | | **Approximate Enrolment** |
|---|---|---|
| Chem 756 | Silicon Chemistry | 8 |
| Chem 2OA3 | Organic Synthesis | 380 |
| Total enrolment is about 650 – 2 sections | | |
| Chem 4PP3 | Polymer Chemistry | 22 |

| **2004-05** | | **Approximate Enrolment** |
|---|---|---|
| Killam Research Fellowship (until Jan. 2005) | | |
| Chem 4G06 | (Course coordinator) | 15 |
| Research supervisor 1 | | |
| Chem 1AA3 | | 350 |

| **2003-04** | **Approximate Enrolment** |
|---|---|

Killam Research Fellowship
Chem 4G06 (Course co-coordinator) 22
Research supervisor
2

| | | Approximate |
|---|---|---|
| **2002-03** | | |
| **Enrolment** | | |
| Chem 760 | Organic Synthesis | 8 |
| Chem 2BA3 | Organic Synthesis | 42 |
| Chem 4G06 | (Course coordinator) | 8 |
| (on Killam Fellowship starting Jan. 2003) | | |
| **2001-02** | | **Approximate** |
| **Enrolment** | | |
| Chem 2L03 | Organic Laboratory | 42 |
| Chem 2BA3 | Organic Synthesis | 42 |
| Chem 1AA3 | Introductory Chemistry (3 units) | 225 |
| **2000-01** | | **Approximate** |
| **Enrolment** | | |
| Chem 760 | Organic Synthesis | 8 |
| Chem 756 | Organosilicon Chemistry | 6 |
| Chem 2L03 | Organic Laboratory | 18 |
| Chem 4G6 | Supervisor, Undergraduate Thesis | 1 |
| Chem 2BA3 | Organic Synthesis | 18 |
| Chem 1AA3 | Introductory Chemistry (3 units) | 275 |
| **1999-2000** | **On sabbatical** | |
| Chem 4G6 | Supervisor, Undergraduate Thesis | 2 |
| **1998-99** | | |
| Chem 760 | Organic Synthesis | 4 |
| Chem 4G6 | Supervisor, Undergraduate Thesis | 2.5 |
| Chem 4D3 | Organic Synthesis | 16 |
| Chem 1AA3 | Introductory Chemistry (3 units) | 400 |
| **1997-98** | | |
| Chem 730a | Organic Synthesis | 7 |
| Chem 4G6 | Supervisor, Undergraduate Thesis | 2 |
| Chem 4D3 | Organic Synthesis | 7 |
| Chem 1AA3 | Introductory Chemistry (3 units) | 400 |
| **1996-97** | | |
| Chem 730a | Organic Synthesis | 7 |
| Chem 4G6 | Supervisor, Undergraduate Thesis | 2 |

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|---|---|---|
| Chem 4D3 | Organic Synthesis | 19 |
| Chem 1AA3 | Introductory Chemistry (3 units) | 400 |
| **1995-96** | | |
| Chem 731c | Organosilicon Chemistry | 10 |
| Chem 4G6 | Supervisor, Undergraduate Thesis | 3 |
| Chem 4D3 | Organic Synthesis | 12 |
| Chem 1AA3 | Introductory Chemistry (3 units) | 400 |
| TSM 4A2 | Theme School on New Materials (2 units, Overload), Seminar Course | 25 |
| **1994-95** | | |
| Chem 730a | Organic Synthesis | 12 |
| Chem 4G6 | Supervisor, Undergraduate Thesis | 2 |
| Chem 4D3 | Organic Synthesis | 12 |
| Chem 1A6 | Introductory Chemistry (3 units) | 400 |
| **1993-94** | | |
| Chem720a, 721 | Molecular Modelling - | 1 |
| a special double module offered to a Masters of Teaching student, overload (unpaid) | | |
| Chem 730a | Organic Synthesis | 12 |
| Chem 731c | Organosilicon Chemistry, Overload | 10 |
| Chem 1A6 | Introductory Chemistry (3 units) | 400 |
| Chem 4G6 | Supervisor, Undergraduate Thesis | 3 |
| Chem 4D3 | Organic Synthesis | 15 |
| **1992-93** (University of Amsterdam, sabbatical leave) | | |
| Graduate Course | Fundamentals of Organosilicon Chemistry | 6 |
| **1991-92** | | |
| Chem 4G6 | Supervisor, Undergraduate Thesis | 2 |
| Chem 730d | Transition Metals/Organic Synthesis | 8 |
| Chem 2D3 | Organic Chemistry, Overload | 125 |
| Chem 3D3 | Organic Chemistry | 40 |
| **1990-91** | | |
| Chem 4G6 | Supervisor, Undergraduate Thesis | 2 |
| Chem 730a | Organic Synthesis | 12 |
| Chem 2D3 | Organic Chemistry, Overload | 125 |
| Chem 721 | Organic Colloquium (Organizer) | 20 |
| Chem 3D3 | Organic Chemistry | 40 |
| **1989-90** | | |
| Chem 4G6 | Supervisor, Undergraduate Thesis | 2 |
| Chem 721 | Organic Colloquium (Organizer) | 20 |

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|---|---|---|
| Chem 3D3 | Organic Chemistry | 50 |
| Chem 731c | Organosilicon Chemistry | 40 |
| **1988-89** | | |
| Chem 4G6 | Supervisor, Undergraduate Thesis | 2 |
| Chem 720b | Molecular modelling | 10 |
| Chem 3D3 | Organic Chemistry | 40 |
| **1987-88** | | |
| Chem 4G6 | Supervisor, Undergraduate Thesis | 2 |
| Chem 720a | Computers in organic chemistry | 12 |
| Chem 730a | Synthesis | 12 |
| **1986-88** | | |
| Chem 206 | Polymer Section | 35 |
| **1986-87** | | |
| Chem 705 | Computers in organic chemistry | 12 |
| Chem 4G6 | Supervisor, Undergraduate Thesis | 2 |
| **1985-86** | | |
| Chem 208 | Polymer Section | 35 |
| Chem 705 | Synthesis, 4 lectures | 20 |
| Chem 4G6 | Supervisor, Undergraduate Thesis | 1 |

**Thesis Committees**

**External Referee**

| Student | Supervisor | Institution | Degree | Year |
|---|---|---|---|---|
| Alexandra Bartole | Dr. I. Manners | University of Toronto | Ph.D. | 2005 |
| Jessie Zhang | Dr. R. Kluger | University of Toronto | Ph.D. | 2005 |
| Nicola Lake | Dr. J. Ralston | Ian Wark Institute, University of South Australia, Adelaide | Ph.D. | 2004 |
| Claire Minard-Basquin | Dr. C. Chaix<br>Dr. C. Pichot | École Normale Supérieure Lyon | Ph.D. | 2000 |
| Sandjeevi-Ranganathan, S. | Dr. R. Whitney, Dr. W. Baker | Queen's University | Ph.D. | 1998 |
| Matuana-Molanda, L. | Dr. J. Balatinecz | University of Toronto | Ph.D. | 1997 |

| | | | |
|---|---|---|---|
| Vlad, F.-I.<br>1997 | Dr. A. Rudin | University of Waterloo | Ph.D. |
| Jihai Ma<br>1996 | Dr. T. Tidwell | University of Toronto | Ph.D. |
| Andrea Dalacu<br>1994 | Dr. M. F. Richardson | Brock University | M.Sc. |
| Umesh R. Parshotam<br>1993 | Dr. Kim Baines | University of Western Ontario | Ph.D. |
| Flores Rutjes<br>1993 | Dr. Henk Hiemstra | Universiteit van Amsterdam | Ph.D. |
| Lucy Lolkema<br>1993 | Prof. Nico Speckamp<br>Dr. Henk Hiemstra | Universiteit van Amsterdam | Ph.D. |
| Wim Jan Koot<br>1993 | Prof. Nico Speckamp<br>Dr. Henk Hiemstra | Universiteit van Amsterdam | Ph.D. |
| Louis Plamondon<br>1988 | Prof. Nico Speckamp<br>Dr. J. Wuest | Université de Montréal | Ph.D. |
| Peter Tai Wah Cheng<br>1988 | Dr. S. MacLean | University of Toronto | Ph.D. |

**McMaster**

| Student | Supervisor | Degree | Year |
|---|---|---|---|
| Greg Bahun | Dr. A. Adronov | | Ph.D |
| Xiangchun Yin | Dr. H. Stover | | Ph.D. |
| Tina Guenther | Dr. J. Valliant | | Ph.D. |
| Adrienne Pedrich | Dr. P. Harrison | | Ph.D. |
| John Kaldis | Dr. M. J. McGlinchey | | Ph.D. |
| Ju Zhang | Dr. R. H. Pelton | | Ph.D. |
| Rahime Benhabbour | Dr. A. Adronov | | Ph.D |
| Sreedhar Cheekoori | Dr. J. McNulty | | M.Sc. |
| Ken Rilling<br>2005 | Dr. J.M. Dickson | | Ph.D. |
| Travis Besanger<br>2005 | Dr. J. Brennan | | Ph.D. |
| Yaling Xu<br>2005 | Dr. R. H. Pelton | | Ph.D. |
| Sanela Martic<br>2005 | Dr. M. Brook | | M.Sc. |
| *An Investigative Study Of Silicon-Based Materials as Alternative Matrices for Maldi-TOF Applications* | | | |
| X. Sui<br>2005 | Dr. J. D. Brennan | | M.Sc. |

| | | |
|---|---|---|
| Bola Sogbein<br>2005 | Dr. John Valliant | Ph.D. |
| Ilena Dumbrava<br>2005 | Dr. W. Leigh | M.Sc. |
| Amro Ragheb<br>2005 | Dr. M. A. Brook | Ph.D. |
| *Controlling Protein-Silicone Interactions by the Modification of Silicone Elastomers with Poly(ethylene oxide)* | | |
| Paul Zelisko<br>2004 | Dr. M. A. Brook | Ph.D. |
| *The interaction of proteins with functionalized silicones* | | |
| Masaaki Amako<br>2004 | Dr. M. A. Brook | Ph.D. |
| *Synergy of Polydimethylsiloxanes and Late Transition Metal Complexes* | | |
| Tom Owens<br>2004 | Dr. W. J. Leigh | Ph.D. |
| Jiahong Tan<br>2004 | Dr. J. Brash | Ph.D. |
| Jacques Archambeault<br>2002 | Dr. J. Brash | Ph.D. |
| Maggie Wang<br>2002 | Dr. R. F. Childs | M.Sc. |
| Guodong Zheng<br>2002 | Dr. H. D. H. Stover | Ph.D. |
| Xioashong Lu<br>2001 | Dr. J. Warkentin | Ph.D. |
| Mustafa Mohamed<br>2001 | Dr. M. A. Brook | Ph.D. |
| Sonya Balduzzi<br>2001 | Dr. Michael Brook | Ph.D. |
| *Reactive Silyl Protecting Groups* | | |
| Brandi Meeks<br>2001 | Dr. H. Shcardown | M.Sc. |
| Ahmed Alzamly<br>withdrawn | Dr. M. A. Brook | Ph.D.- |
| Frank J. LaRonde<br>2000 | Dr. M. A. Brook | Ph.D. |
| $C_2$-symmetric ligands | | |
| Sudarshi Regismond<br>2000 | Dr. F. Winnik | Ph.D. |
| Rodica Stan<br>1999 | Dr. Michael Brook | Ph.D. |
| *Synthesis of Novel Silicones and Silanes for Interface Control* | | |
| Vasiliki Bartzoka<br>1999 | Dr. Michael Brook | Ph.D. |

| | | |
|---|---|---|
| *Silicone Protein Interactions* | | |
| Mark Stradiotto | Dr. Michael Brook | Ph.D. |
| 1999 | (co-supervised with with M. J. McGlinchey) | |
| *The Dynamics and Reactivity of $\eta^1$-Indenyl Complexes* | | |
| Christine Braderic | Dr. W.J. Leigh | Ph.D. |
| 1998 | | |
| Karen Moffat | Dr. H. Stöver | Ph.D. |
| 1998 | | |
| Suzie Rigby | Dr. M. McGlinchey | Ph.D. |
| 1997 | | |
| Stephen Urquhart | Dr. A. Hitchcock | Ph.D. |
| 1997 | | |
| Paul Charpentier *Metallocene-catalyzed semi-batch and continuous polymerization of ethylene* | | |
| | Dr. A. Hamielec | Ph.D. |
| 1997 | | |
| | Dr. M. A. Brook | |
| Ralph Ruffolo *Silanes and Allylsilanes as Possible Precursors for Transition Metal Metal-stabilized Silylium* | | |
| *Ions* | Dr. M. A. Brook | Ph.D. |
| 1997 | | |
| | Dr. M.J. McGlinchey | |
| Howard Ketelson | Dr. M. A. Brook | Ph.D. |
| 1996 | | |
| | Dr. R. H. Pelton | |
| *The Colloidal Stability and Surface Chemistry of Stöber Silica* | | |
| David Valentini | Dr. M. A. Brook | M.Sc. |
| 1996 | | |
| *Silicon-Modified Starch Composites* | | |
| Courtney Henry | Dr. M. A. Brook | Ph.D. |
| 1994 | | |
| *Exploring the Synthetic Utility of Vinyldichlorosilanes and Vinylarylsilanes* | | |
| Graham McGibbon | Dr. J. K Terlouw | Ph.D. |
| 1994 | | |
| Tom Stefanac | Dr. M. A. Brook | M.Sc. |
| 1994 | | |
| *Silane Based Radical Polymerization: Functionalized Homopolymers and Copolymers* | | |
| Mike Roth | Dr. M. A. Brook | M.Sc. |
| 1994 | | |
| *Controlled Formation of New Si-based Materials* | | |
| Sengen Sun | Dr. P. Harrison | Ph.D. |
| 1994 | | |

| | | |
|---|---|---|
| Kai Li<br>1994 | Dr. H. D. H. Stöver | Ph.D. |
| Carol Dallaire<br>1992 | Dr. M. A. Brook | Ph.D. |
| *Study of 1-Methylated-2-trimethylsilyl Cations: An Examination of the β-Effect for Silyl,*<br>*Germyl and Stannyl Groups* | | |
| Andrea Osterroth<br>1991 | Dr. M. A. Brook<br>Dr. R.H. Pelton | M.Sc. |
| *Poly(methyl methacrylate) Sterically Stabilized by Silicone* | | |
| Weifeng Yu<br>1991 | Dr. M. A. Brook | M.Sc. |
| *The Roles of Ligands on Silicon* | | |
| Thomas Sebastian<br>1990 | Dr. M. A. Brook | M.Sc. |
| *Trichlorosilylstyrene Oligomers* | | |
| **Defense Only** | | |
| Ed Ng<br>2005 | Dr. H. Jain, Business | Ph.D. |
| Young-Min Kim<br>2005 | Dr. J. MacGregor, Chem. Eng. | Ph.D. |
| Damian Jankowicz (Chair)<br>2004 | Dr. S. Becker, Psychology | Ph. D. |
| Michelle Vosburgh (Chair)<br>2004 | Dr. J. Weaver, History | Ph. D. |
| Beata Gajewski (Chair)<br>2004 | Dr. M. Jordana, Medical Sciences | Ph.D. |
| Tim Jacobs (Chair)<br>2003 | Dr. J. Ferns, English | Ph.D. |
| Lina Liu<br>2003 | Dr. H. Sheardown, Chem. Eng. | M.Sc. |
| Abhaya Kulkarni<br>2003 | Dr. M. Boyle | Ph.D. |
| Millman, J. (Chair)<br>2003 | Dr. D. Andrews | Ph.D. |
| Pauli Kavalakatt<br>M.Sc. | Dr. H. D. H. Stöver, Chem.<br>2002 | |
| Youqing Shen<br>2001 | Dr. S. Zhu, Chem. Eng. | Ph.D. |
| Nekmohamed Manji<br>Ph.D. | Dr. C. Nahmias, Med. Phys.<br>2001 | |
| Linda Li<br>M.Sc. | Dr. R. Pelton, Chem. Eng.<br>2001 | |

| | | |
|---|---|---|
| Iva Matkovic<br>2001 | Dr. K. Dunbabin, History | Ph.D. |
| Bruce Wilson<br>2001 | Dr. B. Baetz, Civil Eng. | Ph.D. |
| Brandi Meeks<br>2001 | Dr. H. Sheardown, Chem. Eng. | M.Sc. |
| Leslie Ritchie<br>2000 | English | Ph.D. |
| Stevens, Ronald (Chair)<br>2000 | Dr. Weitz, Med. Sci. | Ph.D. |
| Downey, Jeff<br>2000 | Dr. H. Stöver, | Ph.D. |
| Martin, W.<br>1999 | Dr. A. Hrymak | M.Sc. |
| MacKay, Geoff (Chair)<br>1999 | Dr. G. Wright, | Ph.D. |
| Arida, F. (Chair)<br>1998 | Dr. M. Elbastawi, Mech. Eng. | Ph.D. |
| Marriott, Michael (Chair)<br>Ph.D. | Dr. B. Milliken, Psychology<br>1998 | |
| Wu Chen, Iris (Chair)<br>1998 | Dr. M. Blajchman, Medical Sciences | Ph.D. |
| Barker, S.<br>1997 | Dr. G. Purdy, Mat. Sci. & Eng. | Ph.D. |
| Wauben, I.<br>1997 | Dr. S. Atkinson, Nutrition | Ph.D. |
| Marc Webster<br>1996 | Dr. Muller, Biology | Ph.D. |
| Hua Guo<br>1995 | Dr. A. Hamielec | Ph.D. |
| Hui Teng Er<br>1995 | Dr. J. Warkentin | M.Sc. |
| Naomi Laing<br>Ph.D. | Dr. W. Chan, Biochemistry<br>1994 | |
| Darryl Scott Pickering<br>1992 | Dr. L. P. Niles, Neurosciences | Ph.D. |
| Greg Sluggett<br>1993 | Dr. W. J. Leigh | Ph.D. |
| Nien Nguyen<br>1991 | Dr. W. J. Leigh | M.Sc. |
| William Mills<br>1990 | Dr. B. E. McCarry | M.Sc. |
| J. Paul Santerre<br>1990 | Dr. J. Brash, Chemical Engineering | Ph.D. |

| | | |
|---|---|---|
| Charles Younger 1990 | Dr. R.A. Bell | M.Sc. |
| William Gunn withdrawn | Dr. N.H. Werstiuk | Ph.D. |
| Lynn M. Cameron 1990 | Dr. D.B. MacLean | M.Sc. |
| Michel B.M. Mangion 1990 | Dr. G.P. Johari, Materials Science | Ph.D. |
| Richard Perrier 1989 | Dr. M. J. McGlinchey | Ph.D. |
| J. Douglas McCallion 1986 | Dr. J. Warkentin | M.Sc. |

**Committee and Association Activity**

| **McMaster Committees** | **Position** | **Year** |
|---|---|---|
| Dean's Advisory Committee | Member | 2005 |
| Science/Engineering Promotion/Tenure Committee | Member | 2005-2008 |
| Teaching and Learning Grants Assessment Committee | Member | 2005 |
| Intellectual Property Board | Member | 1998-2003 |
| Selection Committee, Associate Dean of Science | Member | 2002 |
| Faculty of Science Undergraduate Curriculum and Calendar | Member | 1998, 2000-01 |
| Health Sciences Admissions Committee | Member | 1998 |
| McMaster Patent Board | Member | 1996-98 |
| President's Task Force on Support of Research at McMaster | Member | 1996 |
| Selection Committee, Dean of Science | Member | 1995 |
| Dean's Advisory Committee on Computing | Member | 1994-96 |
| Faculty Health Sciences Graduate Admissions/Study Committee | Member | 1995-98 |
| Graduate Curriculum and Policy Committee | Member | 1994-7 |
| Salary Anomaly Adjustment Committee Faculty of Science | Member | 1991 |
| Graduate Reviewing Committee Faculty of Science | Member | 1990-92 |
| Hiring Committee, CIS Science Coordinator | Member | 1989 |
| Ad Hoc Committee on Research and Senior Undergraduate Computing Research Needs | Member | 1989 |
| McMaster-IBM Cooperative Project | Member | 1988-89 |
| **Departmental Committees** | | |
| Departmental Advisory Committee | Member | 2005-2006 |
| Nanomaterials Committee (CFI) | CoChair | 2005 |
| Undergraduate Reviewing Committee | Member | 2005-06 |
| Implementation of CHEM3LI3 | Member | 2003 |

| | | |
|---|---|---|
| Departmental Advisory Committee | Member | 2001- |
| 2002 | | |
| Computing Facility Committee | Member | 2001- |
| 2002 | | |
| Accreditation Committee | CoChair | 2001- |
| 2002 | | |
| Undergraduate Curriculum and Calendar Committee | Chair | 2000-02 |
| Freshman Committee | Member | 2000-01 |
| Graduate Curriculum Committee | Member | 2000-01 |
| Undergraduate Curriculum and Calendar Committee | Chair | 1998 |
| Year One Frosh Week (gave lecture) | | 1998 |
| Chemistry Computer Committee | Member | 1998 |
| Organic Comprehensives Coordinator | Chair | 1996-98 |
| Teaching Associates Coordinator | Chair | 1996-97 |
| Chemistry Chair Selection Committee | Member | 1995 |
| Departmental Advisory/P&T Committee | Member | 1994-96 |
| Departmental Seminars | Chair | 1993-96 |
| X-ray Facility Users Committee | Member | 1993-94 |
| Graduate Curriculum Committee | Member | 1993-94 |
| Comprehensive Exam Coordinator | Chair | 1992 |
| Facilities Committee | Member | 1991-92 |
| Departmental Advisory Committee | Member | 1989-93 |
| Departmental Computer Users Committee | Member | 1991 |
| X-ray Facility Users Committee | Member | 1991-92 |
| Selection of X-Ray Facility Manager | Member | 1990-91 |
| Graduate Recruiting | Chair | 1987-90 |
| Graduate Reviewing | Chair | 1987-92 |
| IBM Submission for Masters in Computer Chemistry | Member | 1986-88 |
| Graduate Curriculum | Member | 1986-87 |
| Undergraduate CIC Student Advisor | Chair | 1986-88 |
| Chemistry Club Faculty Advisor | Chair | 1986-87 |
| Safety Committee | Member | 1985-86 |
| Facilities Committee | Member | 1985-87 |

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